PowerBlade Chassis

AT-PBC18

Installation Guide

Allied Telesyn
Simply connecting the IP world

PN 613-50144-00 Rev C

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Electrical Safety and Emission Compliance Statement

Standards: This product meets the following standards:

U.S. Federal Communications Commission
Radiated Energy Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Note: Modifications or changes not expressly approved by the manufacturer or the FCC can void your right to operate this equipment.

Industry Canada
This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

RFI Emission	EN55022 Class A, EN61000-3-2, EN61000-3-3 1

Warning: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. 2

Immunity	EN55024 3
Electrical Safety	EN60950, UL 1950 (UL/cUL) 4
Laser	EN60825 5

Important: Appendix A contains translated safety statements for installing this equipment. When you see the , go to Appendix A for the translated safety statement in your language.

Wichtig: Anhang A enthält übersetzte Sicherheitshinweise für die Installation dieses Geräts. Wenn Sie sehen, schlagen Sie in Anhang A den übersetzten Sicherheitshinweis in Ihrer Sprache nach.

Vigtigt: Tillæg A indeholder oversatte sikkerhedsadvarsler, der vedrører installation af dette udstyr. Når De ser symbolet , skal De slå op i tillæg A og finde de oversatte sikkerhedsadvarsler i Deres eget sprog.

Belangrijk: Appendix A bevat vertaalde veiligheidsopmerkingen voor het installeren van deze apparatuur. Wanneer u de ziet, raadpleeg Appendix A voor vertaalde veiligheidsinstructies in uw taal.

Important: L'annexe A contient les instructions de sécurité relatives à l'installation de cet équipement. Lorsque vous voyez le symbole , reportez-vous à l'annexe A pour consulter la traduction de ces instructions dans votre langue.

Tärkeää: Liite A sisältää tämän laitteen asentamiseen liittyvät käännetyt turvaohjeet. Kun näet -symbolin, katso käännettyä turvaohjetta liitteestä A.

Importante: l'Appendice A contiene avvisi di sicurezza tradotti per l'installazione di questa apparecchiatura. Il simbolo , indica di consultare l'Appendice A per l'avviso di sicurezza nella propria lingua.

Viktig: Tillegg A inneholder oversatt sikkerhetsinformasjon for installering av dette utstyret. Når du ser , åpner du til Tillegg A for å finne den oversatte sikkerhetsinformasjonen på ønsket språk.

Importante: O Anexo A contém advertências de segurança traduzidas para instalar este equipamento. Quando vir o símbolo , leia a advertência de segurança traduzida no seu idioma no Anexo A.

Importante: El Apéndice A contiene mensajes de seguridad traducidos para la instalación de este equipo. Cuando vea el símbolo , vaya al Apéndice A para ver el mensaje de seguridad traducido a su idioma.

Obs! Bilaga A innehåller översatta säkerhetsmeddelanden avseende installationen av denna utrustning. När du ser , skall du gå till Bilaga A för att läsa det översatta säkerhetsmeddelandet på ditt språk.

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Preface

This installation guide contains instructions on how to install a PowerBlade PBC18 on a desktop or in a 19-, 23- or 25-inch rack and how to install the PowerBlade Series Modules.

How This Guide is Organized

This guide contains the following chapters and appendices:

Chapter 1, Overview, describes the features and functions of the PowerBlade PBC18 Chassis.

Chapter 2, Installing the Chassis on a Desktop or in a Rack, explains how to install the chassis on a desktop or in a rack.

Chapter 3, Installing a Power Supply Module, explains how to install a main and optional power supply module into the chassis.

Chapter 4, Installing a Media Converter Module, describes the features and functions of the PowerBlade Media Converter modules and contains installation instructions.

Chapter 5, Installing a Switch Module, describes the features and functions of the PowerBlade Switch modules and contains installation instructions.

Chapter 6, Installing an Optional Management Module, contains instructions on how to install an optional management module.

Chapter 7, Troubleshooting, provides troubleshooting information for the chassis and modules.

Appendix A, Technical Specifications, provides technical specifications for the chassis.

Appendix B, Translated Safety Information, contains multi-language translations of the safety and emission statements in this guide.

Where to Find Related Guides

The Allied Telesyn web site at www.alliedtelesyn.com offers you an easy way to access the most recent documentation, software, and technical information for all of our products.

The following guides are shipped with their respective products and contain abbreviated versions of the installation procedures:

- **AT-PBC18 Quick Install Guide**, PN 613-50145-00
- **AT-PB10 Series Quick Install Guide** PN 613-50146-00
- **AT-PB100 Series Quick install Guide** PN 613-50147-00
- **AT-PB200 Series Quick Install Guide** PN 613-50148-00
- **AT-PB300 Series Quick Install Guid**e PN 613-50198-00
- **AT-PB1000 Series Quick Install Guide** PN 613-50149-00
- **AT-PBM02 Quick Install Guide** PN 613-50172-00
- **AT-PBPWRAC Quick Install Guide** PN 613-50166-00
- **AT-PBPWRDC Quick Install Guide** PN 613-50189-00
- **PowerBlade Rackmount Brackets Quick Install Guide**, PN 613-50230-00

If you purchased a PowerBlade Optional Management module, you will need the following guide:

- **AT-S31 User's Guide** PN 613-50205-00

The AT-S31 User's Guides provides information and instructions for managing the chassis and modules. This guide can be downloaded from Allied Telesyn's web site.

Document Conventions

This guide uses the following conventions:

Note
Notes provide additional information.

Warning
Warnings inform that performing or omitting a specific action may result in bodily injury.

Caution
Cautions inform you that performing or omitting a specific action may result in equipment damage or loss of data.

Contacting Allied Telesyn Technical Support

You can contact Allied Telesyn technical support online or by telephone or e-mail.

Online Support

You can request technical support online by accessing the Knowledge Base from our web site at http:\\kb.alliedtelesyn.com. You can use the Knowledge Base to submit questions to our technical support staff and review answers to previously asked questions.

Telephone Support

For Technical Support by telephone, contact Allied Telesyn at one of the following locations:

Americas
United States, Canada, Mexico, Central America, South America
Tel: 1 (800) 428-4835

Asia
Singapore, Taiwan, Thailand, Malaysia, Indonesia, Korea, Philippines, China, India, Hong Kong
Tel: (+65) 3815-612

Australia
New Zealand
Tel: 1 (800) 000-880

France
Belgium, Luxembourg, The Netherlands, Middle East, Africa
Tel: (+33) 1-60-92-15-25

Germany
Switzerland, Austria, Eastern Europe
Tel: (+49) 30-435-900-126

Italy
Spain, Portugal, Greece, Turkey, Israel
Tel: (+39) 02-41-30-41

Japan
Tel: (+81) 3-3443-5640

United Kingdom
Denmark, Norway, Sweden, Finland, Iceland
Tel: (+44) 1-235-442560

E-mail Support

Latin America, Mexico, Puerto Rico, Caribbean, and Virgin Islands
latin_america@alliedtelesyn.com

Europe
support_europe@alliedtelesyn.com

Returning Products

Products for return or repair must first be assigned a Return Materials Authorization (RMA) number. A product sent to Allied Telesyn without a RMA number will be returned to the sender at the sender's expense.

To obtain an RMA number, contact Allied Telesyn's Technical Support at one of the following locations:

- **North America**
  Toll-free: 1-800-762-1664
  Fax: 1-425-806-1050

- **Europe, Africa, and the Middle East**
  Tel: +44-1793-501401
  Fax: +44-1793-431099

- **Latin America, the Caribbean, and Virgin Islands**
  Tel: International code + 425-481-3852
  Fax: International code + 425-481-3895

- **Puerto Rico**
  Toll-free: 1-800-424-5012, ext 3852
  or 1-800-424-4284, ext 3852

- **Mexico**
  Toll-free: 800-424-5012, ext 3852
  Fax: International code + 425-481-3895

- **Asia and Southeast Asia**
  Tel: +65 381-5612
  Fax: +65 383-3830

- **Australia**
  Toll-free: 1-800-000-880
  Fax: 2-9438-4966

- **New Zealand**
  Toll-free: 0800-45-5782

FTP Server

If you need management software for an Allied Telesyn managed device and you know the file name of the software, you can download the software by connecting directly to our FTP server at ftp.alliedtelesyn.com. At login, enter ‘anonymous’ as the user name and your e-mail address for the password.

For Sales or Corporate Information

You can contact Allied Telesyn for sales or corporate information at the location listed below:

Allied Telesyn, Inc.
19800 North Creek Parkway, Suite 200
Bothell, WA 98011
Tel: 1 (425) 487-8880
Fax: 1 (425) 489-9191

Tell Us What You Think

If you have any comments or suggestions on how we might improve this or other Allied Telesyn documents, please fill out the General Enquiry Form online. This form can be accessed by selecting “Contact Us” from www.alliedtelesyn.com.

Chapter 1

Overview

PowerBlade PBC18 Chassis

The PowerBlade PBC18 is an 18-slot chassis that is designed to hold up to 18 PowerBlade Media Converter modules and Switch modules. The chassis can be used on a desktop or in a 19-, 23- or 25-inch rack.

The front of the chassis has 18-slots for the PowerBlade modules along with six LEDs to notify you of power and management status. The chassis also has a Reset button that allows you to reset the optional management module. (See Figure 1.) The back of the chassis features a PWR 1 expansion slot for the main power supply, a PWR 2 expansion slot for an optional redundant power supply module, and an optional management module expansion slot. (See Figure 2.)

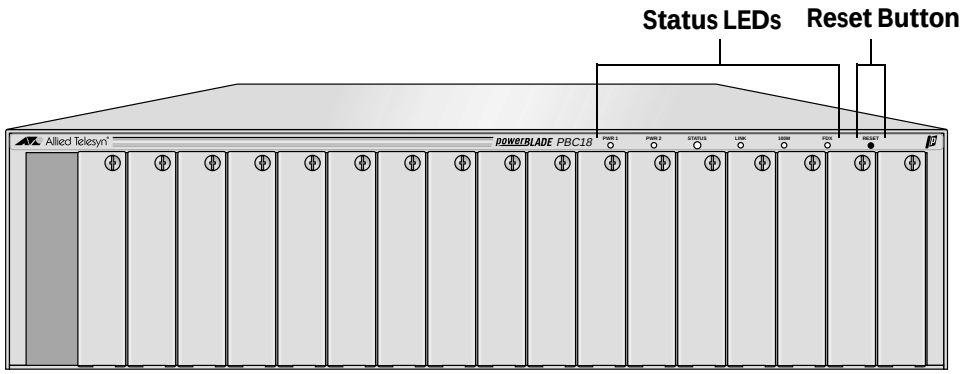

Figure 1 PowerBlade PBC18 Front View

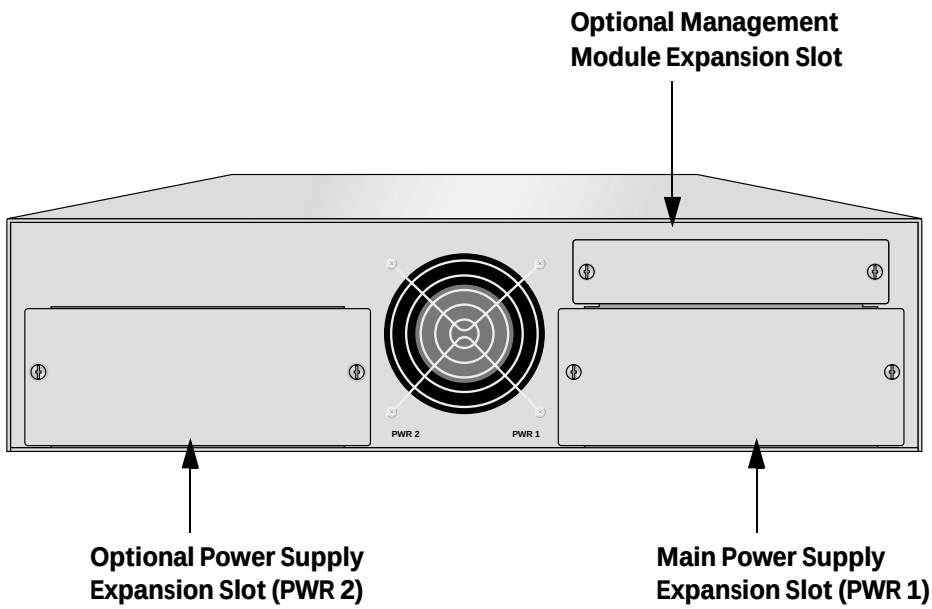

Figure 2 PowerBlade PBC18 Back View

Key Features

- ❑ 18-slots to “mix and match” hot swappable PowerBlade modules
- ❑ LEDs on the front of the chassis for power and management status
- ❑ Desktop or rackmount installation
- ❑ Front mounted Reset button (for use with the management module only)
- ❑ Hot swappable AC or DC power supplies
- ❑ An expansion slot for the main power supply and an optional redundant power supply
- ❑ One expansion slot for an optional management module

Status LEDs

Table 1 defines the power and management LEDs.

Table 1 Status LEDs

LED	Color	Description
Power Modules		
PWR1	Green	The main power supply is functioning normally.
PWR2	Green	The optional redundant power supply, if installed, is functioning normally.
Management Module		
Status	Amber	The module is performing a self-test.
	Flashing Amber	The module is downloading the firmware from a host PC.
	Red	The module or management software is malfunctioning.
	Green	The module is installed and online.
LINK	Green	A valid link has been detected on the RJ-45 port.
100M	Not used at this time.	
FDX	Not used at this time.	

Power Supply

The PowerBlade PBC18 can be either an AC or DC powered chassis. The expansion slot for the main power supply and the optional redundant power supply are located on the back of the chassis. Refer to Figure 2 on page 20.

The main and redundant power supplies can be “hot swapped,” meaning that should either power supply fail, the failed power supply can be removed and replaced with a new power module while the chassis is operating. Network operations will not be interrupted. The power modules to be hot swapped must be the same type. For example, both power supplies must be AC or both must be DC.

Powering ON or OFF the chassis depends on the type of power supply installed. For an AC model, you connect or disconnect the power cord. For a DC model, you connect or disconnect the DC power cables or power OFF the DC circuit to which the power supply is connected.

To install a power supply, refer to Installing a Power Supply Module on page 33. For instructions on hot swapping, refer to Hot Swapping a Power Supply on page 42.

AC Power Supply

The AC power supply operates at 100-120/200-240 V AC with an input frequency of 50/60 Hz at ± 3%. Figure 3 shows an PowerBlade PBC18 with an AC power supply.

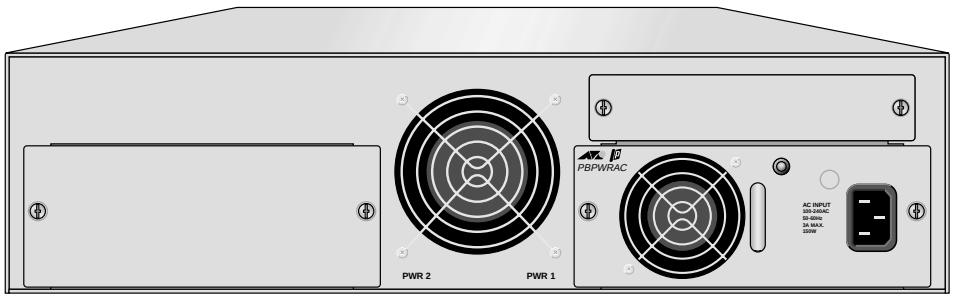

Figure 3 PowerBlade PBC18 with an AC Power Supply

DC Power Supply

The DC power supply has a 48 V DC terminal block connector. Figure 4 shows an PowerBlade PBC18 with a DC power supply.

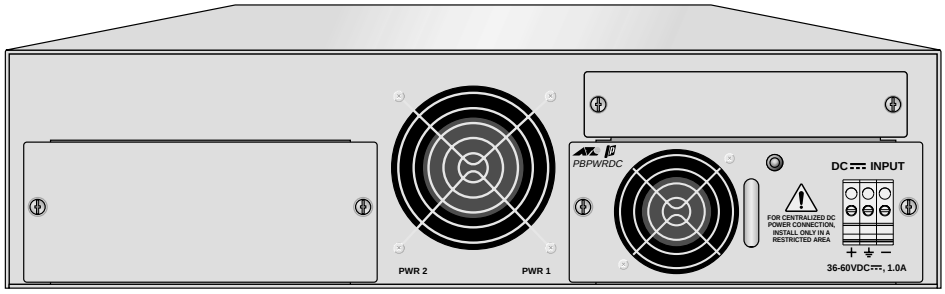

Figure 4 PowerBlade PBC18 with a DC Power Supply

Optional Management Module

The management module is an optional module used to monitor the operating status of the media converters and switches installed the PowerBlade PBC18. Refer to Figure 2 on page 20 for the location of the expansion slot. The management module is not required for the chassis to operate, but it is necessary if you want to locally or remotely monitor and configure the modules and ports.

The management module features a Link, Power, and Status LEDs, as well as a Reset button. (See Figure 5.) The LEDs and the Reset button are duplicated on the front of the chassis for easy monitoring or to reset the management module. You may need to reset the module after completing the installation, adding or hot swapping a power supply, or after upgrading the module's firmware.

To install an optional management module, refer to Installing an Optional Management Module on page 93.

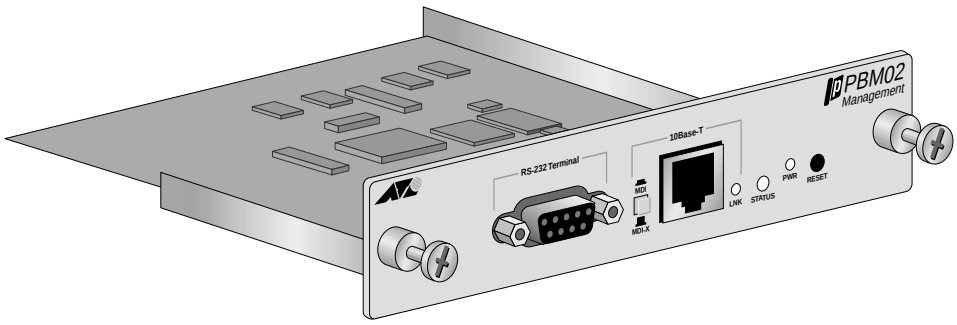

Figure 5 Optional Management Module (AT-PBM02 Model)

Chapter 2

Installing the Chassis on a Desktop or in a Rack

This chapter contains the following procedures:

- ❑ Installing the Chassis on a Desktop on page 28
- ❑ Installing the Chassis in a Rack on page 29

Overview

Verifying Package Contents

Make sure the following items are included in your package. If items are missing or damaged, contact your Allied Telesyn sales representative for assistance.

- ❑ One PowerBlade PBC18 Chassis
- ❑ One rackmounting kit
- ❑ Four protective rubber feet (for desktop installation only)
- ❑ PowerBlade PBC18 Quick Install Guide
- ❑ Warranty card

Preparing the Site

Be sure to observe the following guidelines when planning the installation of your chassis.

- ❑ Make sure that the chassis' power is accessible and cables can be easily connected.
- ❑ Cables must be away from sources of electrical noise such as radios, transmitters, broadband amplifiers, power lines, fluorescent or halogen light fixtures.
- ❑ Air flow around the chassis and through its vents on the side and rear should not be restricted.
- ❑ If you are using the chassis on a desktop, make sure it is placed on a level, secure surface.
- ❑ Do not place objects on top of the chassis.
- ❑ Do not expose the chassis to moisture or water.
- ❑ Make sure the chassis is in a dust-free environment.
- ❑ Use dedicated power circuits or power conditioners to supply reliable electrical power to the network devices.

Reviewing Safety Precautions

Please review the following safety precautions before you install the chassis and the PowerBlade modules. (The first warning applies only if you purchased a module with a fiber optic port.)

Warning
Do not stare into the laser beam. 7

Warning
Electric Shock Hazard: To prevent electric shock, do not remove the cover. There are no user-serviceable parts inside. The unit contains hazardous voltages and should only be opened by a trained and qualified technician. 8

Warning
Lightning Danger: Do not work on this equipment or cables during periods of lightning activity. 9

Caution
Power cord is used as a disconnection device: To de-energize equipment, disconnect the power cord. 10

Warning
Electrical-Type Class 1 Equipment: This equipment must be earthed. The power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts. 11

Caution
Pluggable Equipment: The socket outlet should be installed near the equipment and should be easily accessible. 12

Caution
Air vents: The air vents must not be blocked on the unit and must have free access to the room ambient air for cooling. 13

Caution
Operating Temperature: This product is designed for a maximum ambient temperature of 40°C. 14

Caution
All Countries: Install this product in accordance with local and National Electric Codes. 15

Caution
Lithium Battery - Should only be changed by trained and qualified technician.

Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Attention: IL y a danger d'explosion s'ily y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagés conformement aux instructions du fabricant. 21

Installing the Chassis on a Desktop

This section explains how to install the chassis on a desktop. To install the chassis in a rack, refer to Installing the Chassis in a Rack on page 29.

For desktop installation, perform the following procedure:

1. Remove all the items from the shipping package and store the packaging material in a safe location. In case you need to return the chassis to Allied Telesyn, you will need to ship the unit back using as much of the original packaging material as possible.
2. Place the chassis upside down on a level, secure surface.
3. Attach one of the protective rubber feet to each corner of the chassis, then turn the unit right side up. See Figure 6.

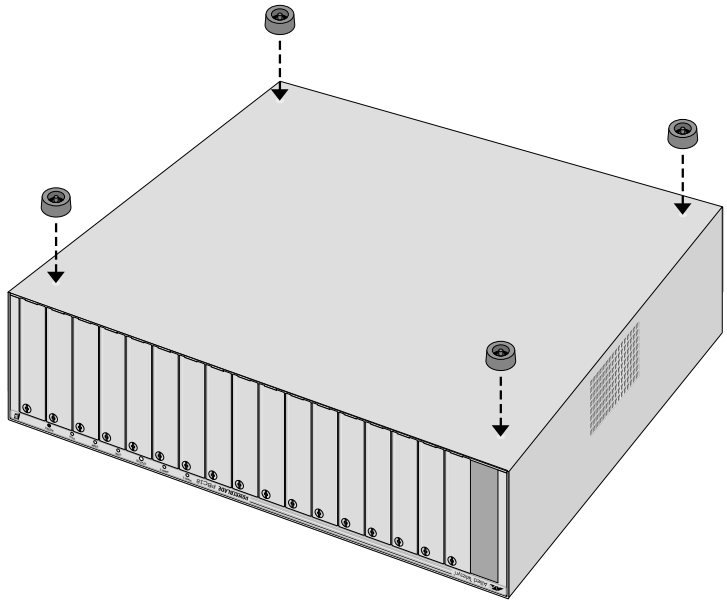

Figure 6 Attaching the Protective Rubber Feet

4. Apply power to the chassis by connecting the AC power cord or DC wires. Refer to Chapter 3, Installing a Power Supply Module on page 33 for instructions.

Installing the Chassis in a Rack

The chassis can be installed in a 19-, 23-, or 25-inch rack. It is recommended that you install the chassis in the rack before installing the PowerBlade modules.

For rackmount installation, perform the following procedure:

1. Remove the protective rubber feet from the bottom of the chassis, if attached, as shown in Figure 7.

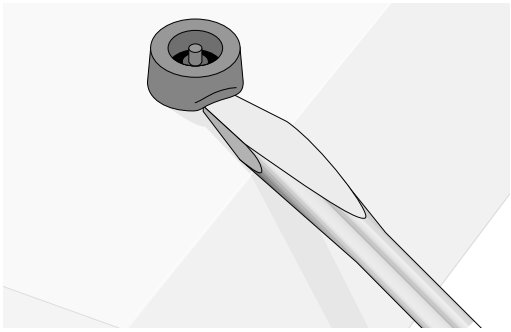

Figure 7 Removing the Protective Rubber Feet

2. Attach the brackets to either the front or middle of the side of the chassis, as shown in Figure 8.

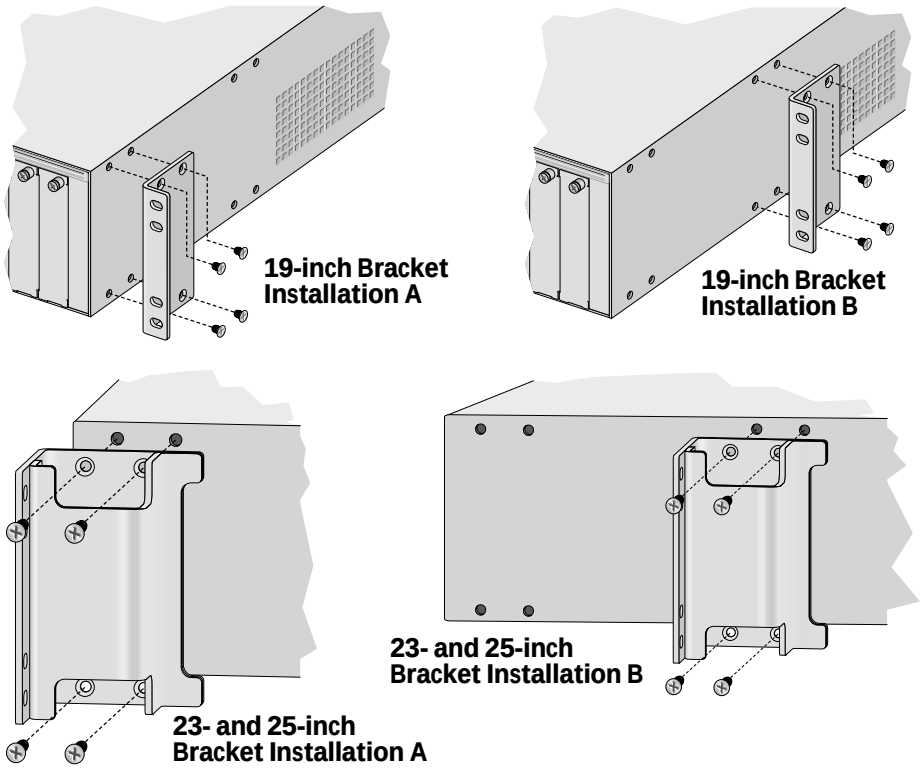

Figure 8 Attaching the Brackets to the PowerBlade PBC18

Note
The chassis may be heavy and awkward to lift. It is recommended that you get assistance with the next step.

3. Attach the chassis to the rack with 4 screws (not provided) for each side. Refer to Figure 9.

Note
The brackets are designed to be installed in the center of a 3U high opening on a standard rack.

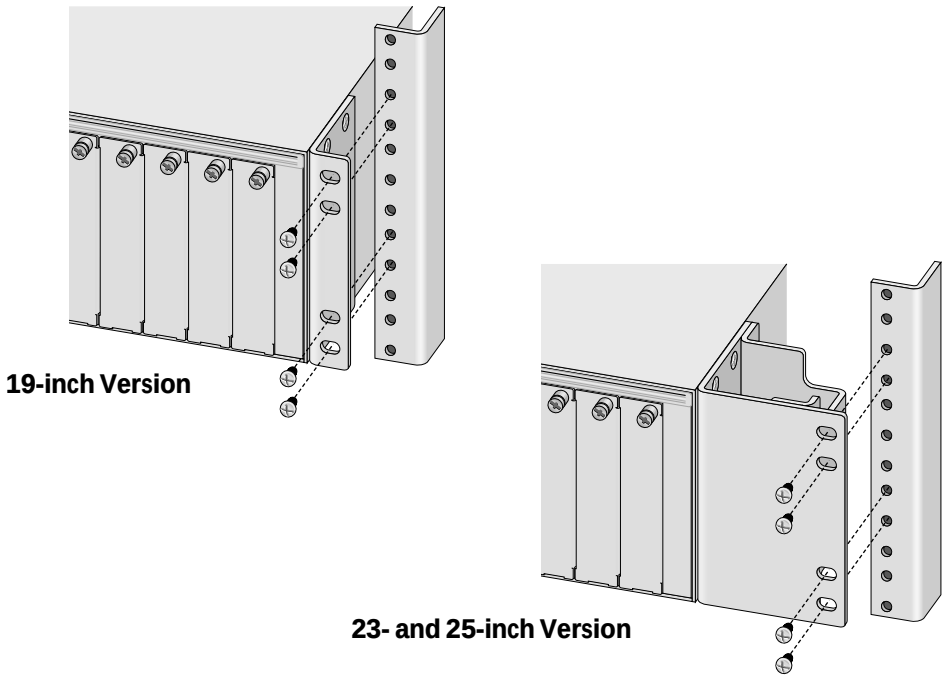

Figure 9 Installing the Chassis in a Rack

Caution
Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord. ↷ 10

4. Apply power to the chassis by connecting the AC power cord or DC wires. Refer to Chapter 3, Installing a Power Supply Module on page 33 for instructions.

Note
If you purchased an optional management module, install the module before applying power to the chassis. Refer to Installing an Optional Management Module on page 93 for installation instructions.

Warranty Registration

When you have finished installing the product, you should register your product by completing the enclosed warranty card and sending it in.

Chapter 3

Installing a Power Supply Module

This chapter describes of the features and functions of the PowerBlade Power Supply modules. This chapter also contains the following procedures:

- Installing a Main Power Supply on page 35
- Installing an Optional Power Supply on page 40
- Hot Swapping a Power Supply on page 42

Overview

There are two types of power modules available for the PowerBlade PBC18: an AT-PBPWRAC and an AT-PBPWRDC. The AT-PBPWRAC is an AC power supply module and the AT-PBPWRDC is a DC power supply module.

Figure 10 illustrates an AC power supply module.

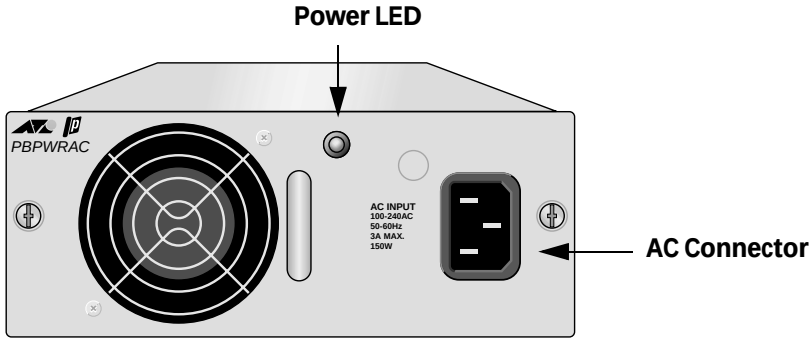

Figure 10 AT-PBPWRAC Power Supply Module

Figure 11 illustrates a DC power supply module.

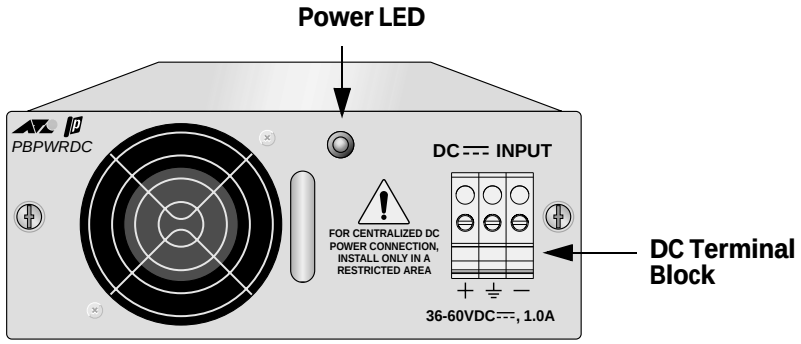

Figure 11 AT-PBPWRDC Power Supply

An optional power supply share the load of powering the chassis with the main power supply. This is known as “load-sharing.” In the event the main power supply fails, the optional power supply will provide full power to the chassis, thereby preventing a system failure.

The main and optional power supplies can be “hot swapped,” meaning that should either power supply fail, the failed power supply can be removed and replaced with a new power module while the chassis is operating. Network operation will not be interrupted. The power modules to be hot swapped must be the same type. You cannot install an AC power supply and a DC power supply in the same chassis.

The back of the PowerBlade PBC18 has two expansion slots: one for the main power supply and one for the optional power supply. The power module installed in the PWR 1 expansion slot is for the main power supply. The power module installed in the PWR 2 expansion slot is for the optional power supply.

Powering ON or OFF the chassis depends on the type of power supply installed. For an AC model, you connect or disconnect the power cord. For a DC model, you connect or disconnect the DC power cables or power OFF the DC circuit to which the power supply is connected.

Installing a Main Power Supply

To install a main power supply, perform the following procedure:

1. Remove the PWR 1 blank faceplate from the back of the chassis by loosening the two thumbscrews, as shown in Figure 12.

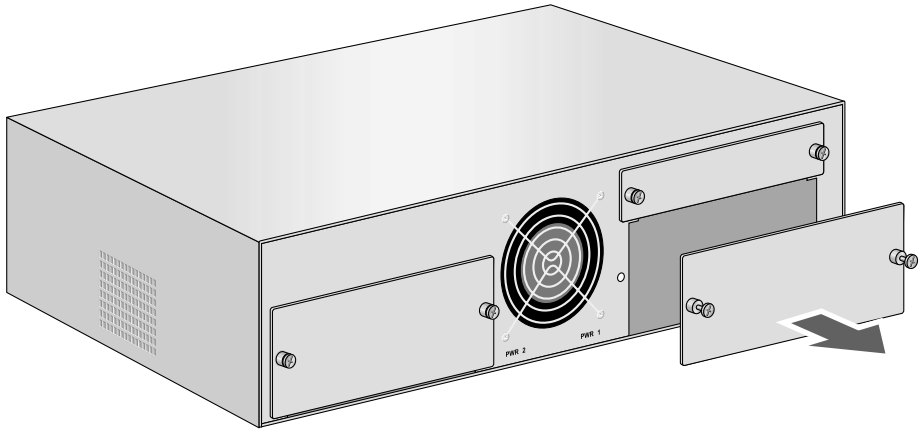

Figure 12 Removing the Main Power Supply Blank Faceplate

2. Remove the power supply from the shipping package and store the packaging material in a safe location.

3. Slide the power supply into the expansion slot, gently seating the power supply's connector into the chassis' backplane. See Figure 13.

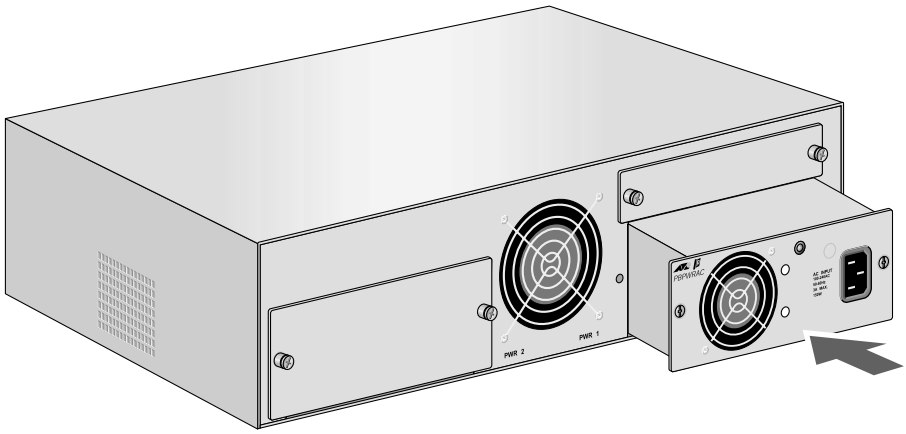

Figure 13 Installing the Main Power Supply

4. Secure the power supply to the chassis by tightening the two thumbscrews.

Caution
Power cord is used as a disconnection device: To de-energize equipment, disconnect the power cord. (AC model only.) 10

5. For an AC powered chassis, plug one end of the power cord to the back of the power supply and plug the other end to a power outlet. Proceed to Step 7 on page 39 for further instructions.

Note
If you purchased an optional management module, install the module before applying power to the chassis. Refer to Installing an Optional Management Module on page 93 for installation instructions.

6. For a DC powered chassis, perform the following steps:

   a. Before attaching wires to the DC terminal block on the power supply module, review the following warning:

Warning
As a safety precaution, a 10 Amp circuit breaker should be installed at the supply end of the cable to be used with this LAN equipment.

Always connect the wiring to the LAN equipment first before connecting the wiring to the breaker. To avoid the danger of physical injury from electrical shock, do not work with HOT feeds. Always be sure that the breaker is in the OFF position before connecting the wiring to the breaker. 16

b. Identify the **positive**, frame **ground** and **negative** terminals using the positive (+), ground (⏚), and negative (-) symbols on the DC power supply. See Figure 14.

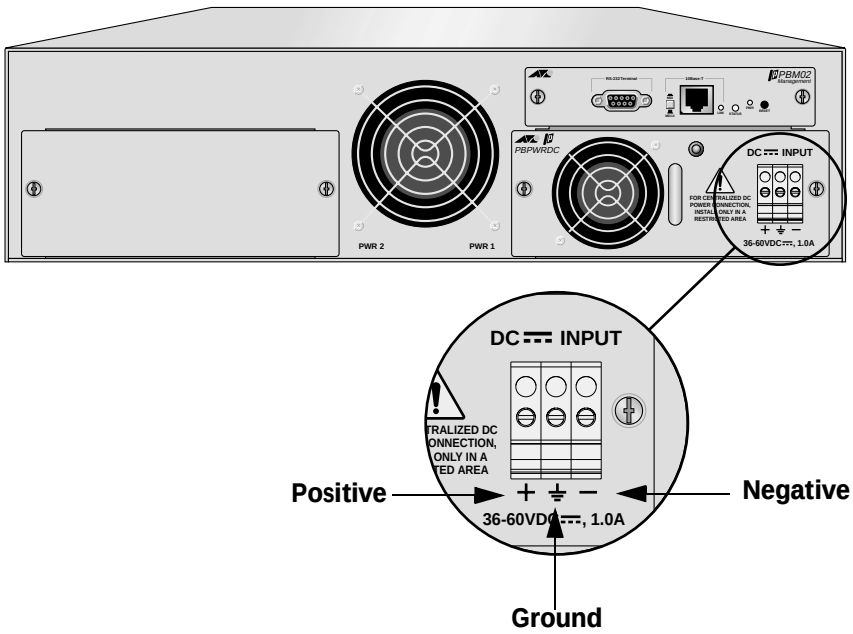

Figure 14 Positive, Ground, and Negative Symbols

c. Strip the three wires in the cable tray coming from the DC input power source to 8 millimeters ± 1 millimeters (0.31 inches ± 0.039 inches) using a 14-gauge wire-stripping tool. See Figure 15.

Warning
Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation. 17

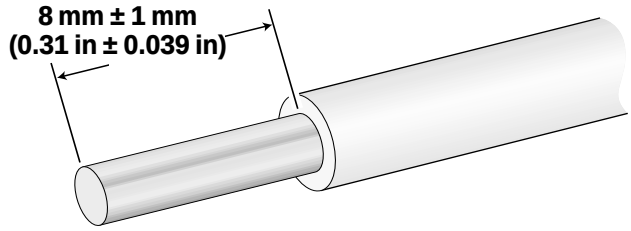

Figure 15 Stripped Wire

d. Connect the frame ground wire to the terminal marked with the ground symbol by inserting the wire into the terminal block and tightening the connection with a flathead screwdriver. See Figure 16.

Warning
When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. 18

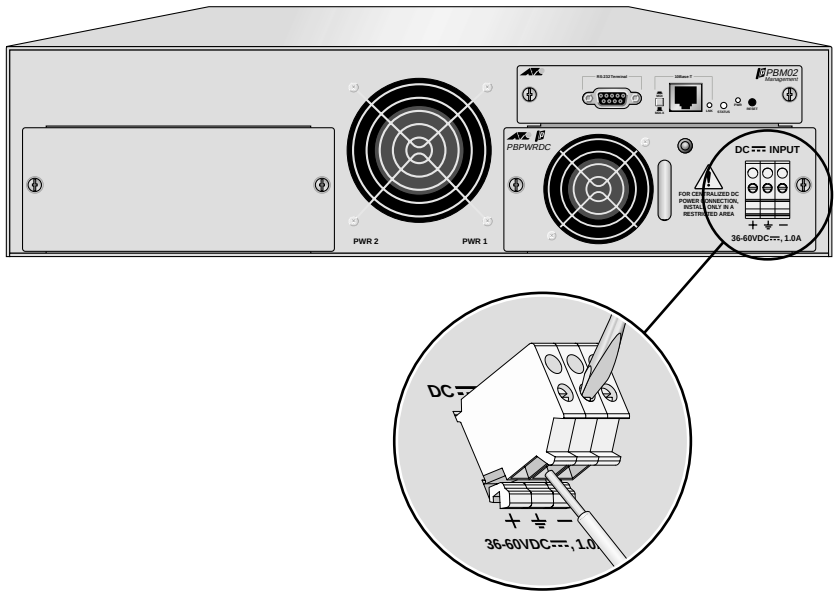

Figure 16 Connecting the Stripped Wire

e. Connect the positive feed wire to the terminal block marked **+** (positive).

f. Connect the negative feed wire to the terminal block marked **-** (negative).

Warning
Safety Hazard - Check to see if there are any exposed copper strands coming from the installed wires. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires. 19

g. Secure the tray supply cable near the rack using multiple cable ties (not provided). This will help minimize the chance of the connections being disturbed by casual contact with the wiring. It is recommended that you use at least four cable ties 10 centimeters (4 inches) apart with the first one located within 15 centimeters (6 inches) of the terminal block.

Note
This system will work with a positive grounded or negative grounded DC system. 20

h. Connect the three DC wires to a DC power source.

7. Check that the PWR1 LED on the front of the chassis is green. If the LED is OFF, refer to Troubleshooting on page 99 for assistance.

The PowerBlade PBC18 is now ready for use. Proceed to Installing a Media Converter Module on page 43 or Installing a Switch Module on page 77 for further instructions.

Installing an Optional Power Supply

To install an optional power supply, perform the following procedure:

Note
It is recommended that you connect the main and optional power supplies to power outlets on separate power circuits to protect your chassis from a loss of power due to a power circuit failure.

1. Remove the PWR 2 blank faceplate from the back of the chassis by loosening the two thumbscrews, as shown in Figure 17.

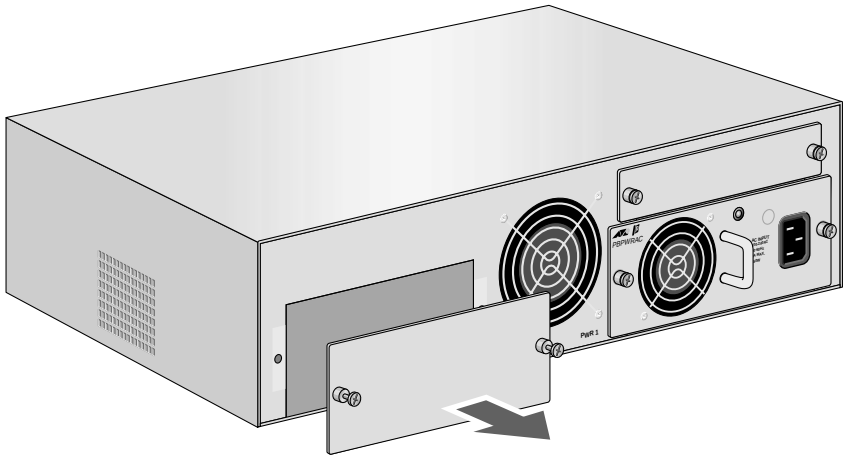

Figure 17 Removing the Optional Power Supply Blank Faceplate

2. Remove the power supply from the shipping package and store the packaging material in a safe location.

3. Slide the optional power supply into the expansion slot, gently seating the power supply's connector into the chassis' backplane. See Figure 18.

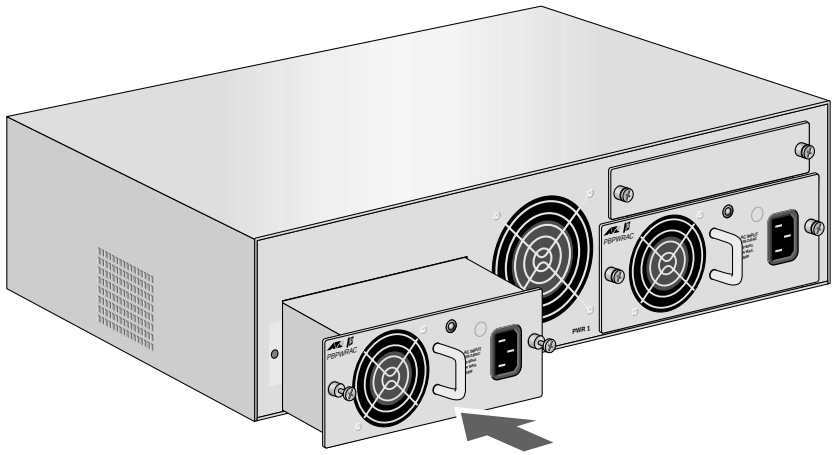

Figure 18 Installing an Optional Power Supply

4. Secure the optional power supply to the chassis by tightening the two thumbscrews.

Note
It is recommended that you connect the main and optional power supplies to power outlets on separate power circuits to protect your chassis from a loss of power due to a power circuit failure.

5. Apply power to the module by connecting the appropriate power cord or wires. Refer to , Step 5 on page 36 for an AC unit or Step 6 on page 36 for a DC unit.

6. Check that the PWR LED on the front of the chassis is green. If the LED is OFF, refer to Troubleshooting on page 99.

The PowerBlade PBC18 is now ready for use. Proceed to Installing a Media Converter Module on page 43 or Installing a Switch Module on page 77 for further instructions.

Hot Swapping a Power Supply

Both the main and optional power supplies are hot swappable. The power modules to be hot swapped must be the same type. You cannot install an AC power supply and a DC power supply in the same chassis.

1. To remove a failed power supply, you must power OFF the appropriate power source. To do this, perform one of the following:

   - ❑ For an AC model, unplug the power cord from the power outlet and then unplug the power cord from the failed module.
   - ❑ For a DC model, follow the steps below:

Warning
When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. 18

   a. Remove the positive and negative feed wires from the terminal block by loosening the screws to the wire connections with a flathead screwdriver.

   b. Remove the frame ground wire from the terminal block by loosening the screw to the wire connection with a flathead screwdriver.

2. Loosen the two thumbscrews and slide out the failed power supply.
3. Remove the new power supply from the shipping package and store the packaging material in a safe location.
4. Slide the new power supply into the expansion slot, gently seating the power supply's connector into the chassis' backplane.
5. Secure the new power supply to the chassis by tightening the two thumbscrews.

Note
It is recommended that you connect the main and optional power supplies to power outlets on separate circuits to protect your chassis from loss of power due to a power circuit failure.

6. Apply power to the new module by connecting the AC power cord or DC wires. Refer to Step 5 on page 36 for an AC unit or Step 6 on page 36 for a DC unit.
7. Check that the PWR LED on the font of the chassis is green. If the LED is OFF, refer to Troubleshooting on page 99.

The new power supply is now ready for use.

Chapter 4
Installing a Media Converter Module

This chapter describes the features and functions of the following PowerBlade Media Converter modules:

- AT-PB10 Series Modules on page 51
- AT-PB100 Series Modules on page 56
- AT-PB300 Series Modules on page 65
- AT-PB1000 Series Module on page 69

This chapter also contains the following procedures:

- Installing a Media Converter on page 73
- Hot Swapping a Media Converter on page 76

Overview

The PowerBlade Media Converters are designed to extend the distance of your network by interconnecting LAN devices that are physically separated by large distances.

There are several different PowerBlade modules that you can “mix and match” in a chassis. The media converter modules come in a variety of port configurations, connectors types, and operating distances. PowerBlade Media Converters are available with an RJ-45 twisted pair connector and either an BNC standard thin Ethernet connector or a FJ, LC, MT-RJ, SC, ST, or VF-45 fiber optic connector. Depending on the model, the media converters feature a maximum operating distance of 100 meters (328 feet) to 100 kilometers (62 miles).

Common Features

The following is a list of features common to most PowerBlade Media Converter modules:

- ❑ LEDs for unit and port status
- ❑ MDI/MDI-X feature that eliminates the need for a crossover cable (except for the AT-PB1000 Series)
- ❑ Link Test feature performs a link test on the module's port
- ❑ MissingLink™ notifies end-nodes of link failures
- ❑ Half-duplex or full-duplex operation

MDI/MDI-X

An RJ-45 port on a 10 Mbps or 100 Mbps Ethernet network device can have one of two possible wiring configurations: MDI or MDI-X. The RJ-45 port on a PC, router or bridge is typically wired as MDI, while the twisted pair port on a switch or hub is usually MDI-X.

> **Note**
> This feature is available for all PowerBlade modules except for the AT-PB1000 Series.

To connect two 10 Mbps or 100 Mbps network devices together that have dissimilar port wiring configurations, such as MDI to MDI-X, you use a straight-through cable. To connect two network devices that have an RJ-45 port with the same wiring configuration, such as MDI to MDI, you use a crossover cable.

The PowerBlade 10 Mbps and 100 Mbps media converters that have an RJ-45 port feature an MDI/MDI-X button. You can use this button to configure the twisted pair port on the media converter as either MDI or MDI-X, thus eliminating the need for a crossover cable regardless of the type of network device you are connecting to the unit.

Table 2 lists the pinouts of the RJ-45 ports for both MDI and MDI-X wiring configurations.

Table 2 RJ-45 Pinout

MDI		MDI-X	
Pin	**Signal**	**Pin**	**Signal**
1	TD +	1	RD+
2	TD-	2	RD-
3	RD+	3	TD+
6	RD-	6	TD-
4, 5, 7, 8	N/A	4, 5, 7, 8	N/A

Link Test/ MissingLink

The Link Test/MissingLink (LT/ML) button or switch, depending on your module, allows you to perform a link test on the media converter ports and to activate the MissingLink feature on the unit. Both features are describe in the following section.

Link Test

The link test is a fast and easy way for you to test the connections between the media converter ports and the end-nodes that are connected to the ports. If a network problem occurs, you can perform a link test to determine which port is experiencing a problem, and be able to focus your troubleshooting efforts on the cable and end-node where the problem resides.

A link test is performed when the LT/ML button or switch is in LT position. For instructions on performing a link test, refer to Troubleshooting on page 99.

Note
Performing a link test does not interfere with a media converter's ability to pass network traffic, except for the AT-PB1000 Series modules.

MissingLink

The MissingLink feature enables the ports on the media converter to pass the “Link” status of their connections to each other. When the media converter detects a problem with one of the ports, such as the loss of connection to a end-node, the media converter shuts down the connection to the other port, thus notifying the end-node that the connection has been lost.

For example, if the network twisted pair cable on a AT-PB101 were to fail, the module would respond by dropping the link on the fiber optic port. In this way, the AT-PB101 notifies the end-node connected to the fiber optic port that the connection on the twisted pair port has been lost. If the failure had started with the fiber optic cabling, the unit would drop the link to the twisted pair port.

The value to this type of network monitoring and fault notification is that some hubs and switches can be configured to take a specific action in the event of the loss of connection on a port. In some cases, the unit can be configured to seek a redundant path to a disconnected end-node or send out a trap to a network management station, alerting the network administrator of the problem.

Note
MissingLink is disabled when you perform a link test with the MissingLink/Link Test feature. Consequently, to ensure that the MissingLink is enabled on the media converter, always set the ML/LT to the ML position during normal network operations.

Half-duplex and Full-duplex Mode

Duplex mode refers to the way an end-node sends and receives data on the network. An end-node that is operating in half-duplex mode can either send data or receive data, but it cannot do both at the same time. An end-node that is operating in full-duplex mode can send and receive data simultaneously. The best network performance is achieved when an end-node can operate at full-duplex, since the end-node is able to both send and receive data simultaneously.

All of the PowerBlade Media Converters are transparent to the duplex mode of the end-nodes that are connected to their two ports. That is, a PowerBlade Media Converter can operate with end-nodes operating at either half-duplex or full-duplex mode. However, the two end-nodes connected to the ports on a PowerBlade Media Converter must operate with the same duplex mode.

For example, assume that the 100Base-TX port on an AT-PB102 is connected to a port on an AT-FH705E hub configured for half-duplex operation, while the 100Base-FX port is connected to a port on an AT-8224XL switch configured for full-duplex operation. This would be an invalid configuration and could adversely impact the performance of the network. Either the port on the AT-FH705E hub connected to the 100Base-TX port would have to be changed to full-duplex (if it supports that capability), or the port on the AT-8224XL switch connected to the 100Base-FX port would need to be changed to half-duplex.

Network Topologies

The PowerBlade Media Converters can be used in two different topologies: standalone and back-to-back. Both types of topologies are described below.

Standalone Topology

A standalone topology is when one media converter is used to interconnected two end-nodes. Figure 19 illustrates a standalone topology that uses one AT-PB1001/1 module to interconnect two remote campuses. Campus 1 has an AT-8224XL switch with an AT-A15/LX expansion module connected to the 1000Base-LX port on the AT-PB1001/1. Campus 2 has an AT-8216FXL switch with an AT-A15/SX expansion module connected to the 1000Base-SX port on the AT-PB1001/1.

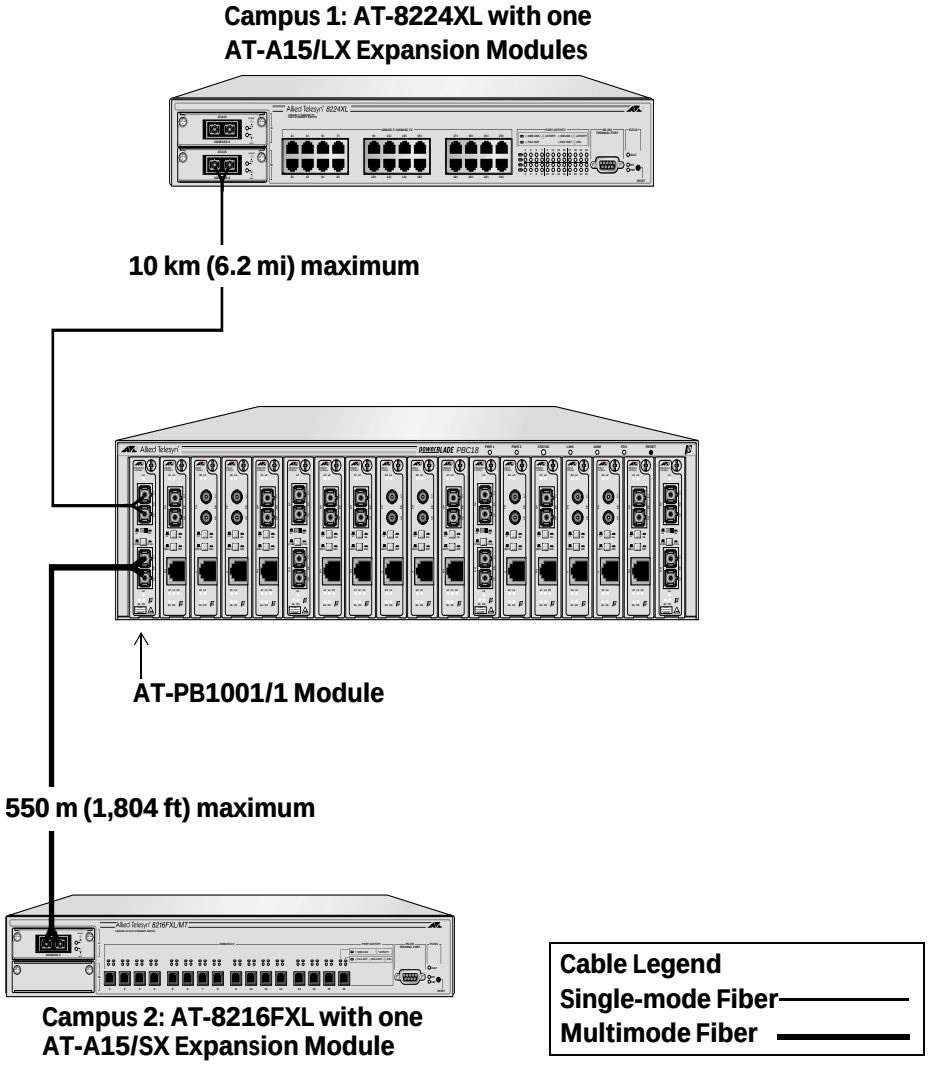

Figure 19 Standalone Topology

Back-to-back Topology

A back-to-back topology is when two media converters are used to interconnect the end-nodes. Figure 20 illustrates a back-to-back topology that uses an AT-PB1001/4 and an AT-MC1001 media converter to connect two remote campuses. Campus 1 has an AT-8224XL switch with an AT-A15/SX expansion module connected to the 1000Base-SX port on the AT-PB1001/4. The 1000Base-LX port on the AT-PB1001/4 is connected to the 1000Base-LX port on the AT-MC1001. The 1000Base-SX port on the AT-MC1001 is connected to the AT-8224XL switch at Campus 2.

In this example, the two media converters are used both to extend the distance of your network and also convert the fiber optic cable from multimode to single-mode and back again.

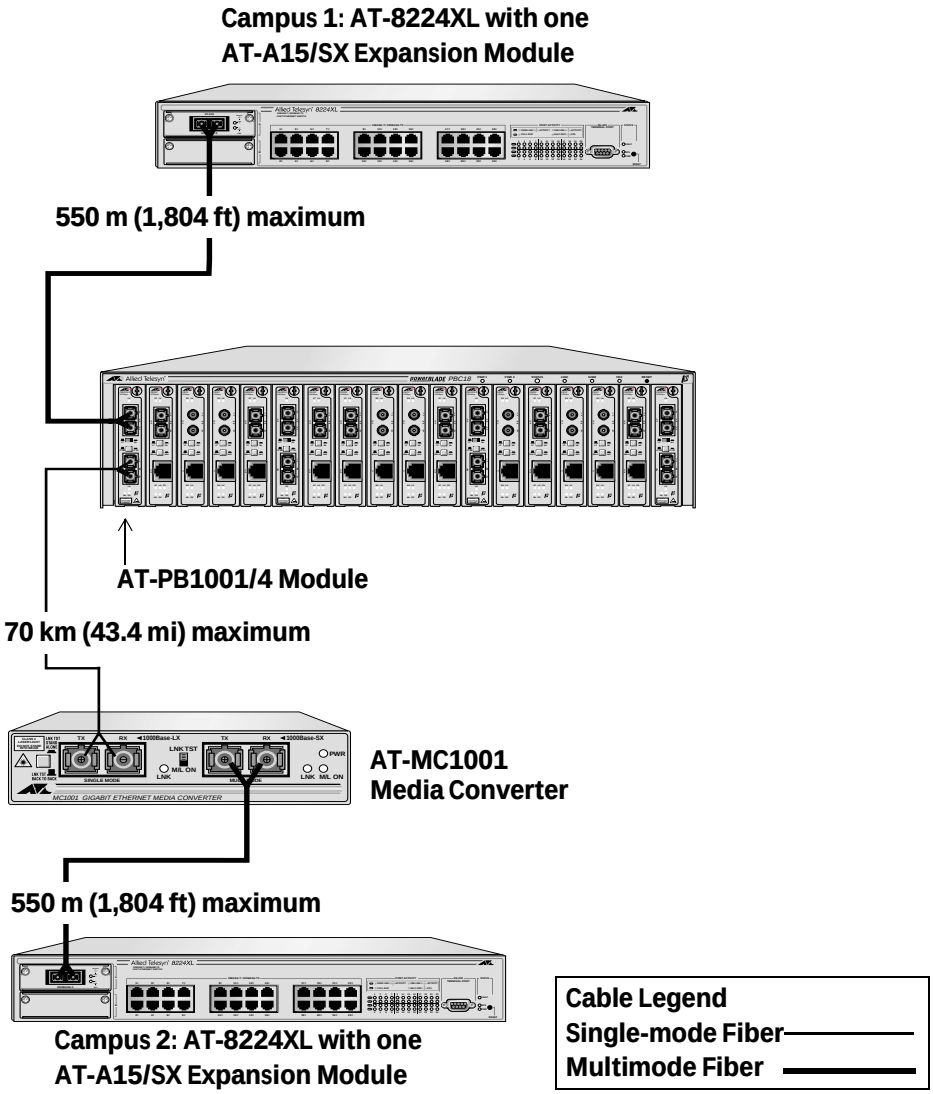

Figure 20 Back-to-back Topology

AT-PB10 Series Modules

The AT-PB10 Series Media Converters feature the following modules:

- ❑ AT-PB13
- ❑ AT-PB14
- ❑ AT-PB15

The AT-PB13 and AT-PB14 media converters have a 10Base-T twisted pair port and a 10Base-F fiber optic port. The twisted pair port has an RJ-45 connector and a maximum operating distance of 100 meters (328 feet). The fiber optic port has an ST or SC connector and a maximum operating distance of 2 kilometers (1.2 miles). These units operate at 10 Mbps and feature full-duplex operation.

The AT-PB15 has a 10Base-T twisted pair port and a 10Base2 thinnet port. The twisted pair port has an RJ-45 connector and a maximum operating distance of 100 meters (328 feet). The thinnet port has a BNC-type connector and a maximum operating distance of 185 meters (606 feet). The AT-PB15 operates at 10 Mbps and features half-duplex operation only.

AT-PB13 Media Converter Module

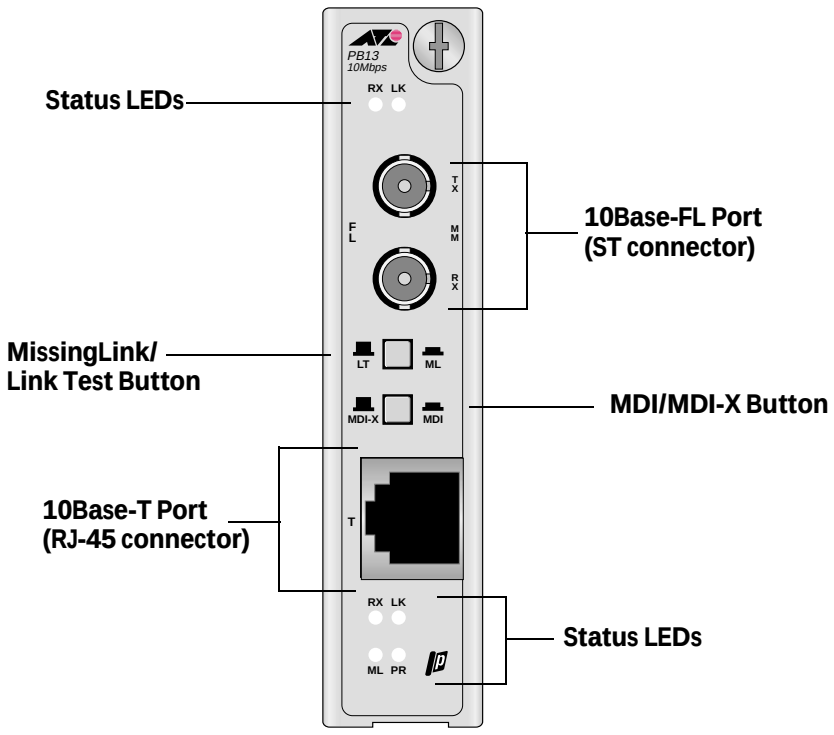

Figure 21 AT-PB10 Series Media Converter

Table 3 lists the connector types and maximum distances for the AT-PB13 and AT-PB14 media converter modules.

Table 3 AT-PB13 and AT-PB14 Maximum Operating Distances

Model	10Base-FL Port		10Base-T Port	
	Connector	**Maximum Distance**	**Connector**	**Maximum Distance**
AT-PB13	ST	2 km (1.2 mi)	RJ-45	100 m (328 ft)
AT-PB14	SC	2 km (1.2 mi)	RJ-45	100 m (328 ft)

Status LEDs

Table 4 list the status LEDs.

Table 4 AT-PB10 Series Status LEDs

LED	Color	Description
All Models		
PR	Green	Power is applied to the media converter.
LK	Green	A link has been established on the port.
RX	Green	Data is being received.
ML	Green	The MissingLink feature is enabled on the media converter.
	OFF	The MissingLink feature is disabled and the media converter is performing a link test.
AT-PB15 Only		
TX	Green	Data is being transmitted on the BNC port.
RX	Green	Data is being received on the BNC port.
ONLINE	Green	The BNC port is connected to an active 10Base2 segment.
COL	Green	The BNC port is sensing a collision signal.

BNC Termination Switch (AT-PB15 only)

The BNC Termination switch on the AT-PB15 offers 50 Ω termination without the use of a T-connector and 50 Ω barrel terminator. Only end-point nodes need 50 Ω termination. Internal nodes on a thinnet segment should be connected to the cable through standard 10Base2 T-connectors. Figure 22 shows the location of the BNC Termination switch on the AT-PB15.

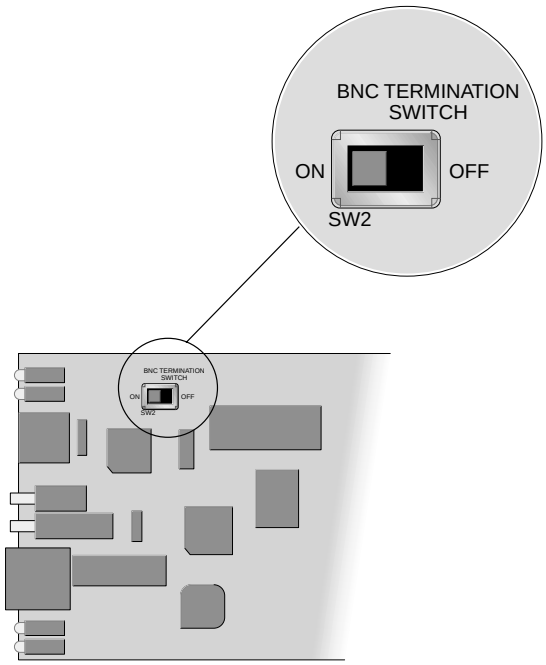

Figure 22 BNC Termination Switch

J5 Jumper (AT-PB15 only)

The AT-PB15 module features a J5 jumper. There are two possible jumper settings: Enable and Disabled. If the chassis does not contain an AT-PBM02 management module, set the J5 jumper to the Enable (RIGHT) position. If the chassis contains an AT-PBM02 management module, set the J5 jumper to the Disabled (LEFT) position. Disabled is the factory default setting. Refer to Figure 23 for the location of the J5 jumper.

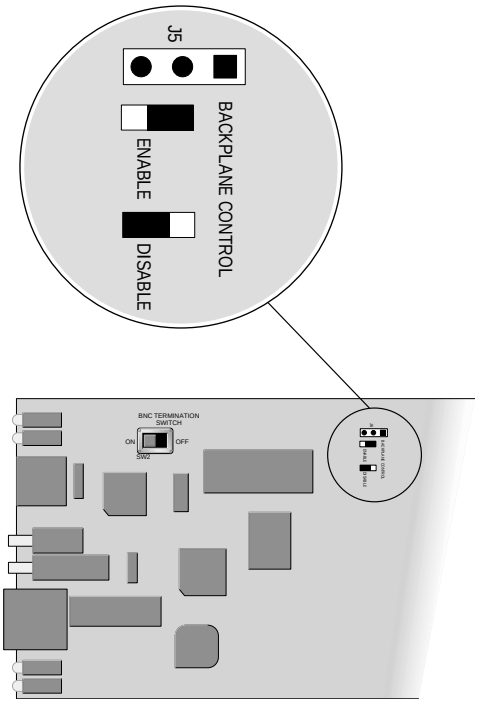

Figure 23 J5 Jumper Location for the AT-PB15 Module

Cable Specifications

Table 5 lists the cable specifications for the 10Base-T twisted pair port for all AT-PB10 Series modules.

Table 5 10Base-T Port Specifications

Connector	Cable	Maximum Distance[1]
RJ-45	Shielded or unshielded twisted pair Category 3 or better	100 m (328 ft)

1. Maximum distance can only be obtained when the UTP/STP cabling is installed and verified to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard.

The second port on the AT-PB15 has a BNC connector with a maximum operating distance of 185 meters (606 feet) using thinnet cabling.

Table 6 lists the cable specifications for the 10Base-F fiber optic port on the AT-PB13 and AT-PB14 when operating in full-duplex mode.

Table 6 10Base-F Port Specification (Full-duplex)

Model	Connector	Cable	Maximum Distance[1]
AT-PB13	ST	50/125 µm or 62.5/125 µm multimode	2 km (1.2 mi)
AT-PB14	SC	50/125 µm or 62.5/125 µm multimode	2 km (1.2 mi)

1. Maximum distance over Multimode Fiber (MMF) is 2 km (1.2 mi) if and only if the maximum measured optical loss budget is less than 20 dB's when measured at 850 nm optical wavelength.

AT-PB100 Series Modules

The AT-PB100 Series Media Converters feature the following modules:

- ❑ AT-PB101
- ❑ AT-PB102
- ❑ AT-PB103/1
- ❑ AT-PB103/2
- ❑ AT-PB103/3
- ❑ AT-PB103/4

The AT-PB100 Series Media Converters feature an 100Base-TX twisted pair port and an 100Base-FX fiber optic port. The twisted pair port has an RJ-45 connector and a maximum operating distance of 100 meters (328 feet). The fiber optic port has an ST or SC connector and a maximum operating distance of 2 kilometers (1.2 miles) to 100 kilometers (62 miles), depending on the model. Both ports operate at 100 Mbps and feature half-duplex or full-duplex operation.

AT-PB101 Media Converter Module

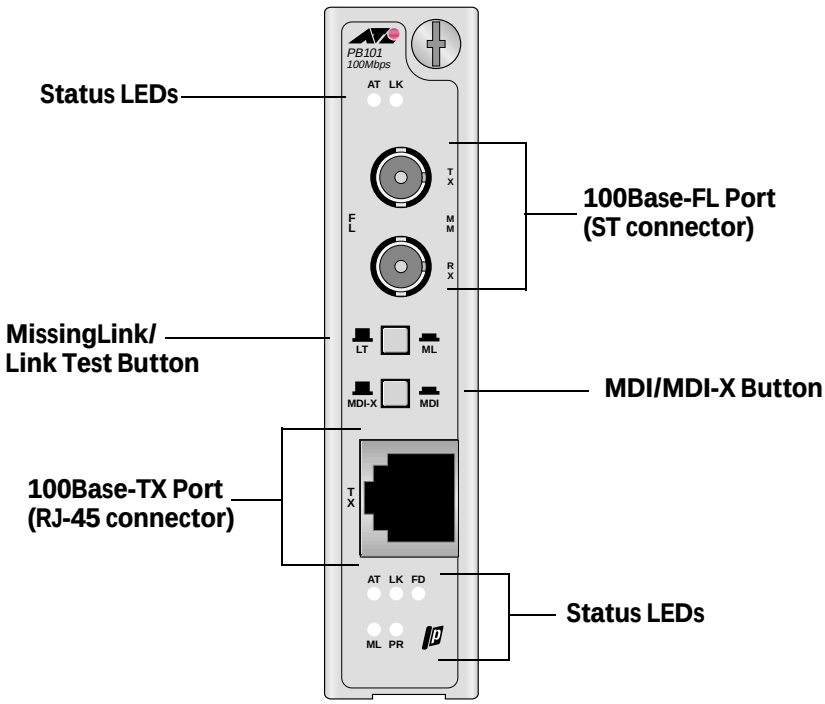

Figure 24 AT-PB100 Series Media Converter

Table 7 lists the connector types and maximum distances for the AT-PB100 Series Media Converter modules.

Table 7 AT-PB100 Series Maximum Operating Distances

Model	100Base-FX Port		100Base-TX Port	
	Connector	**Maximum Distance[1]**	**Connector**	**Maximum Distance[2]**
AT-PB101	ST	2 km (1.2 mi)	RJ-45	100 m (328 ft)
AT-PB102	SC	2 km (1.2 mi)	RJ-45	100 m (328 ft)
AT-PB103/1	SC	15 km (9.3 mi)	RJ-45	100 m (328 ft)
AT-PB103/2	SC	40 km (24.8 mi)	RJ-45	100 m (328 ft)
AT-PB103/3	SC	75 km (46.5 mi)	RJ-45	100 m (328 ft)
AT-PB103/4	SC	100 km (62 mi)	RJ-45	100 m (328 ft)

1. Maximum distance for 100 Mbps Optical Datalinks are dependent on the following factors: type of optical fiber, duplex mode of both end-nodes, and maximum optical loss budget for each of the optical fibers at the operating optical wavelength.
2. Maximum distance can only be obtained when the UTP/STP cabling is installed and verified to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard.

Status LEDs

Table 8 lists the status LEDs.

Table 8 AT-PB100 Series Status LEDs

LED	Color	Description
PR	Green	Power is applied to the media converter.
LK	Green	A link has been established on the port.
AT	Green	Data is being received on the port.
FD	Green	The media converter is operating in full-duplex mode.
	OFF	The media converter is operating in half-duplex mode.
ML ON	Green	The MissingLink feature is enabled on the media converter.
	OFF	The MissingLink feature is disabled and the media converter is performing a link test.

Cable Specifications

Table 9 lists the cabling specifications for the 100Base-TX twisted pair port for all AT-PB100 Series modules.

Table 9 100Base-TX Twisted Pair Specifications

Connector	Cable	Maximum Distance
RJ-45	Shielded or unshielded twisted pair Category 5 or better	100 m (328 ft)

Table 10 lists the cable specifications for the 100Base-FL fiber optic port for all AT-PB100 Series Media Converters when operating in full-duplex mode.

Table 10 100Base-FX Fiber Optic Port Specifications (Full-duplex)

Model	Cable	Maximum Distance[1]	Maximum Allowable Loss Budget
AT-PB101	50/125 or 62.5/125 µm multimode	2 km (1.2 mi)	13 dB at 1310 nm
AT-PB102	50/125 or 62.5/125 µm multimode	2 km (1.2 mi)	13 dB at 1310 nm
AT-PB103/1	9/125 µm single-mode	15 km (9.3 mi)	16 dB at 1310 nm
AT-PB103/2	9/125 µm single-mode	40 km (24.8 mi)	30 dB at 1310 nm
AT-PB103/3	9/125 µm single-mode	75 km (46.5 mi)	33 dB at 1310 nm
AT-PB103/4	9/125 µm single-mode[2]	100 km (62 mi)	34 dB at 1550 nm

1. Maximum distance for 100 Mbps Optical Datalinks is dependent on the following factors: type of optical fiber, duplex mode of both end-nodes, and maximum optical loss budget for each of the optical fibers at the operating optical wavelength.
2. The cable must be non-dispersion-shifted, dispersion-shifted, or non-zero dispersion-shifted single-mode fiber optic cable.

Table 11 lists the cable specifications for the 100Base-FX fiber optic port for all AT-PB100 Series modules when operating in half-duplex mode.

Table 11 100Base-FX Fiber Optic Port (Half-duplex)[1]

Number of Media Converters	Connected Devices	Maximum Distance
One Media Converter Inline	Switch to Switch	372 m (1,221 ft)
	Workstation to Switch	372 m (1,221 ft)
	Switch to Class I Repeater	137 m (450 ft)
	Switch to Class II Repeater	185 m (607 ft)
Two Media Converters Inline	Switch to Switch	332 m (1,089 ft)
	Workstation to Switch	332 m (1,089 ft)
	Switch to Class I Repeater	97 m (318 ft)
	Switch to Class II Repeater	145 m (476 ft)

1. The total distance of all fiber lengths cannot exceed the limits stated in the table. Each media converter used inline within a single collision domain reduces the overall segment length by 40 meters (131 feet).

100Base-FX Fiber Optic Port Specifications

The following tables lists the technical specifications for the fiber optic ports using 50/125 or 62.5/125 multimode or 9/125 single-mode fiber optic cable.

Table 12 Fiber Optic Transmitter

Model	Cable	Optical Frequency	Launch Power[1]		
			Maximum	Average	Minimum
AT-PB101 and AT-PB102	50/125 µm multimode	1310 nm	-14.0 dBm	-20.3 dBm	-22.5 dBm
	62.5/125 µm multimode	1310 nm	-14.0 dBm	-16.8 dBm	-19.0 dBm
AT-PB103/1	9/125 µm single-mode	1310 nm	-8.0 dBm	-11.5 dBm	-15.0 dBm
AT-PB103/2	9/125 µm single-mode	1310 nm	0.0 dBm	-3.0 dBm	-5.0 dBm
AT-PB103/3	9/125 µm single-mode	1310 nm	0.0 dBm	-2.0 dBm	-4.0 dBm
AT-PB103/4	9/125 µm single-mode	1550 nm	0.0 dBm	-1.5 dBm	-3.0 dBm

1. The launch power is measured at one meter from the transmitter.

Table 13 Fiber Optic Receiver

Model	Fiber Optic Diameter	Optical Frequency	Receive Power		
			Minimum	Typical	Saturation
AT-PB101 and AT-PB102	50/125 or 62.5/125 µm multimode	1310 nm	-31.8 dBm	-34.5 dBm	-14.0 dBm
AT-PB103/1	9/125 µm single-mode	1310 nm	-31.0 dBm	-31.0 dBm	-8.0 dBm
AT-PB103/2	9/125 µm single-mode	1310 nm	-35.0 dBm	-38.0 dBm	0.0 dBm
AT-PB103/3	9/125 µm single-mode	1310 nm	-37.0 dBm	-37.0 dBm	-3.0 dBm
AT-PB103/4	9/125 µm single-mode	1550 nm	-37.0 dBm	-37.0 dBm	-3.0 dBm

Table 14 Fiber Optic Datalink

Model	Fiber Type	Minimum Power / Link Budget	Average Signal Loss	Minimum Distance Specs.[1]	Maximum Distance
AT-PB101 and AT-PB102	50/125 µm multimode	13.00 dB	18.70 dB	0	2 km (1.2 mi)
	62.5/125 µm multimode	16.80 dB	22.50 dB	0	2 km (1.2 mi)
AT-PB103/1	9/125 µm single-mode	16.00 dB	19.50 dB	0	15 km (9.3 mi)
AT-PB103/2	9/125 µm single-mode	30.00 dB	35.00 dB	0	40 km (24.8 mi)
AT-PB103/3	9/125 µm single-mode	33.00 dB	35.0 dB	15 km (9.3 ft)	75 km (46.5 mi)
AT-PB103/4	9/125 µm single-mode	34.00 dB	35.50 dB	40 km (24.8 mi)	100 km (62 mi)

1. In all cases where the maximum transmitter output power exceeds the receivers saturation level the recommneded minimum range is stated. This is to prevent blinding or burning out the optical receiver on the far end-node.

Table 15 Fiber Optic Loss Specifications (Benchmarks)

Fiber Type	Fiber Optic Diameter	Optical Frequency	Typical Loss Factor	Worst Case Loss Factor	Bandwidth
Multimode	50/125 µm	850 nm	3.00 dB/km	3.50 dB/km	400 Mhz-km
	50/125 µm	1310 nm	1.00 dB/km	1.50 dB/km	400 Mhz-km
	62.5/125 µm	850 nm	3.00 dB/km	3.75 dB/km	200 Mhz-km
	62.5/125 µm	1310 nm	1.00 dB/km	1.50 dB/km	500 Mhz-km
	100/140 µm	850 nm	4.00 dB/km	4.00 dB/km	100 Mhz-km
Single-mode	9/125 µm	1310 nm	0.40 dB/km	1.00 dB/km	N/A
	9/125 µm	1550 nm	0.30 dB/km	0.75 dB/km	N/A

Auto-negotiation Switch

The AT-PB100 Series Media Converters feature an auto-negotiation switch on the board that disables the auto-negotiation feature (IEEE 802.3u) of the media converter. In most configurations you should leave the auto-negotiation feature enabled so the unit can automatically determine the appropriate duplex mode, based on the capabilities of the end-nodes. For example, the auto-negotiation feature on the media converter should be left enabled in situations where both end-nodes are also capable of auto-negotiation or where both end-nodes have been pre-set to the same mode, such as half-duplex. Figure 25 shows the location of the auto-negotiation switch for the AT-PB100 Series Media Converters.

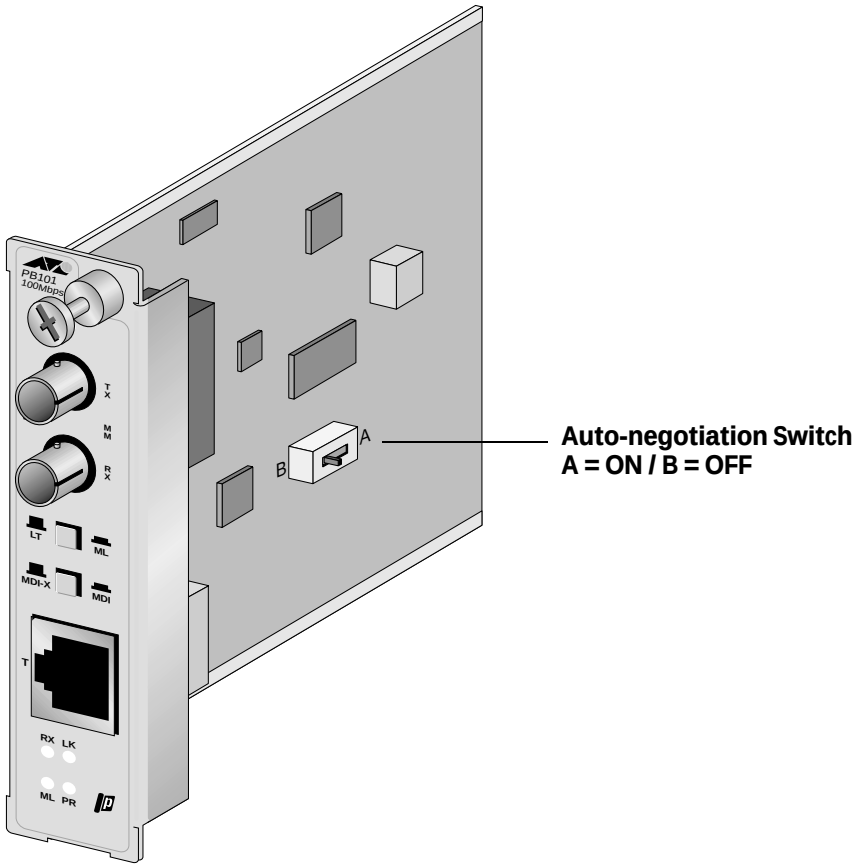

Figure 25 Auto-negotiation Switch

There is one situation, however, where it may be necessary to disable the auto-negotiation feature, and that is to prevent a mismatch from occurring between the duplex modes of the end-nodes. For example, Figure 26 shows two units that have been connected with a AT-PB100 Series Media Converter. Unit 1 is an Ethernet hub that is capable of operating in half-duplex mode only. Unit 2 is a switch that can operate in either half- or full-duplex mode, and will auto-negotiation the duplex mode.

In attempting to auto-negotiate with Unit 1, the media converter will determine that the unit is capable of half-duplex only and will set the port connected to the unit appropriately. In auto-negotiating with Unit 2, the media converter will determine that the unit can manage full-duplex and will set the port connected to the unit to full-duplex. The result is a mismatch, with one port on the media converter operating in half-duplex and the other port operating in full-duplex. This is referred to as a common duplex mode mismatch and will result in poor network performance between the end-nodes.

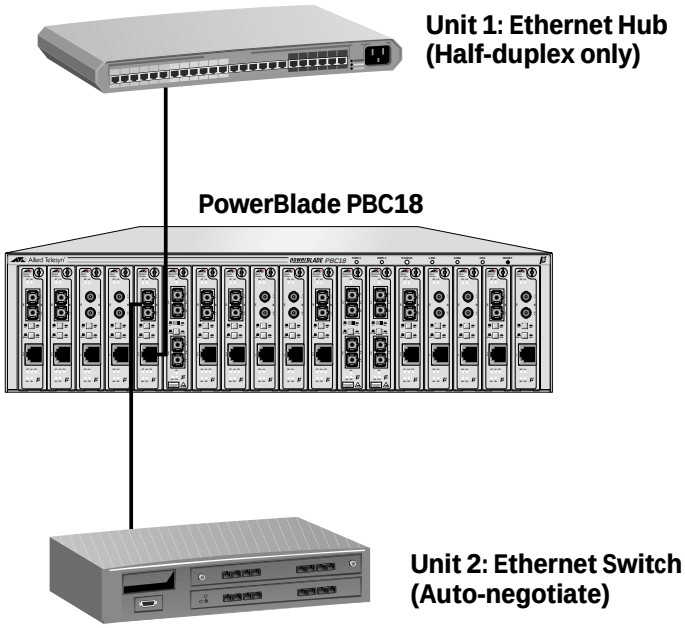

Figure 26 Example of a Duplex Mode Mismatch

You can resolve a duplex mode mismatch in one of two ways:

- Manually configure one of the units so that its duplex mode matches the other end-node. In the example, you could configure Unit 2, if possible, so that the port connected to the media converter is set to half-duplex.
- Disable auto-negotiation on the media converter using the auto-negotiation switch. With auto-negotiation on the media converter disabled, an end-node that auto-negotiates will assume that the media converter is capable of only half-duplex operation. In the example, with auto-negotiation disabled on the media converter, Unit 2 will automatically set its port to half-duplex, thus eliminating the mismatch in duplex modes between the end-nodes.

AT-PB300 Series Modules

The AT-PB300 Series Media Converters feature the following modules:

- ❑ AT-PB301
- ❑ AT-PB302

The AT-PB300 Series Media Converters have an 100Base-TX twisted pair port and an 100Base-FX fiber optic port. The twisted pair port has a RJ-45 connector and a maximum operating distance of 100 meters (328 feet). The fiber optic port has a FJ, LC, MT-RJ, or VF-45 connector, depending on the model, and a maximum operating distance of 2 kilometers (1.2 miles). The AT-PB300 Series Media Converters operate at 100 Mbps and feature half-duplex and full-duplex operation.

AT-PB302 Media Converter Module

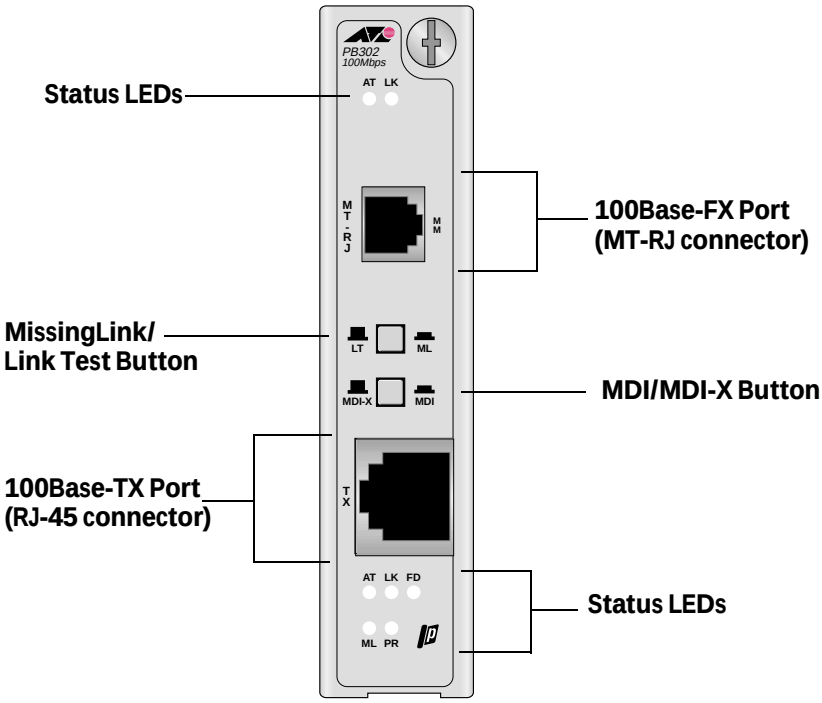

Figure 27 AT-PB300 Series Media Converter (AT-PB302 model)

Table 16 lists the connector types and maximum distances for the AT-PB300 Series Media Converter modules.

Table 16 AT-PB300 Series Maximum Operating Distances

Model	100Base-TX Port		100Base-FX Port	
	Connector	Maximum Distance[1]	Connector	Maximum Distance[2]
AT-PB301	RJ-45	100 m (328 ft)	VF-45	2 km (1.2 mi)
AT-PB302	RJ-45	100 m (328 ft)	MT-RJ	2 km (1.2 mi)

1. Maximum distance can only be obtained when the UTP/STP cabling is installed and verified to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard.
2. Maximum distance for 100 Mbps Optical Datalinks are dependent on the following factors: type of optical fiber, duplex mode of both end-nodes, and maximum optical loss budget for each of the optical fiber at the operating optical wavelength.

Status LEDs

Table 17 defines the status LEDs.

Table 17 AT-PB300 Series Status LEDs

LED	Color	Description
PR	Green	Power is applied to the media converter.
ML	Green OFF	The MissingLink feature is enabled. The MissingLink feature is disabled and the media converter is performing a link test.
FD	Green OFF	The unit is operating in full-duplex mode. The unit is operating in half-duplex mode.
LK	Green	A link is established on the port.
AT	Flashing Green	Data is being received or transmitted by the port.

Cable Specifications

Table 18 lists the cable specifications for the 100Base-TX twisted pair port for all AT-PB300 Series modules.

Table 18 Twisted Pair Cabling Specifications

Connector	Cable	Maximum Distance
RJ-45	Unshielded or shielded twisted pair Category 5 or better	100 m (328 ft)

Table 19 lists the cable specifications for the 100Base-FX fiber optic port for all AT-PB300 Series modules when operating in full-duplex mode.

Table 19 Fiber Optic Port Specifications (Full-duplex)

Cable	Maximum Distance	Maximum Allowable Loss Budget
50/125 µm multimode fiber optic cable	2 km (1.2 mi)	13.0 dB at 1310 nm
62.5/125 µm multimode fiber optic cable	2 km (1.2 mi)	16.8 dB at 1310 nm

Table 20 lists the cable specifications for the 100Base-FX fiber optic port for all AT-PB300 Series modules when operating in half-duplex mode.

Table 20 Fiber Optic Port Cabling Specifications (Half-duplex)

Cable	Number of Media Converters	Connected Devices[1]	Maximum Distance
50/125 or 62.5/125 µm multimode fiber optic cable	One Media Converter Inline	Switch to Switch	372 m (1221 ft)
		Workstation to Switch	372 m (1221 ft)
		Switch to Class I Repeater	137 m (450 ft)
		Switch to Class II Repeater	185 m (607 ft)
	Two Media Converters Inline	Switch to Switch	332 m (1089 ft)
		Workstation to Switch	332 m (1089 ft)
		Switch to Class I Repeater	97 m (318 ft)
		Switch to Class II Repeater	145 m (476 ft)

1. Each media converter used inline within a single collision domain will reduce the overall segment length by 40 meters (131.24 feet) of fiber.

Table 21 and Table 22 list the technical specifications for the fiber optic port for all AT-PB300 Series modules.

Table 21 Fiber Optic Port Launch Power and Receive Power

Cable	Launch Power			Receive Power		
	Maximum	**Average**	**Minimum**	**Minimum Sensitivity**	**Typical Sensitivity**	**Saturation**
50/125 µm	-14.0 dBm	-20.3 dBm	-22.5 dBm	-31.8 dBm	-34.5 dBm	-14.0 dBm
62.5/125 µm	-14.0 dBm	-16.8 dBm	-19.0 dBm	-31.8 dBm	-34.5 dBm	-14.0 dBm

Table 22 Fiber Optic Datalink

Cable	Optical Frequency	Minimum Power/Link Budget	Average Signal Loss
50/125 µm	1310 nm	13.0 dB	18.70 dB
62.5/125 µm	1310 nm	16.8 dB	22.50 dB

Auto-negotiation Switch

The AT-PB300 Series Media Converters feature an auto-negotiation switch on the board that disables the auto-negotiation feature (IEEE 802.3u) of the media converter. Refer to Auto-negotiation Switch on page 63 for more information.

AT-PB1000 Series Module

The AT-PB1000 Series Media Converters feature the following modules:

- ❑ AT-PB1001/1
- ❑ AT-PB1001/2
- ❑ AT-PB1001/3
- ❑ AT-PB1001/4

The AT-PB1000 Series Gigabit Media Converters have a 1000Base-SX port and a 1000Base-LX port. The 1000Base-SX port has an SC connector and a maximum operating distance of 550 meters (1,804 feet). The 1000Base-LX port also has an SC connector with a maximum operating distance of 10 kilometers (6.2 miles) to 70 kilometers (43.4 miles), depending on the model. Both ports operate at 1000 Mbps and feature half-duplex or full-duplex operation.

AT-PB1001/1 Media Converter Module

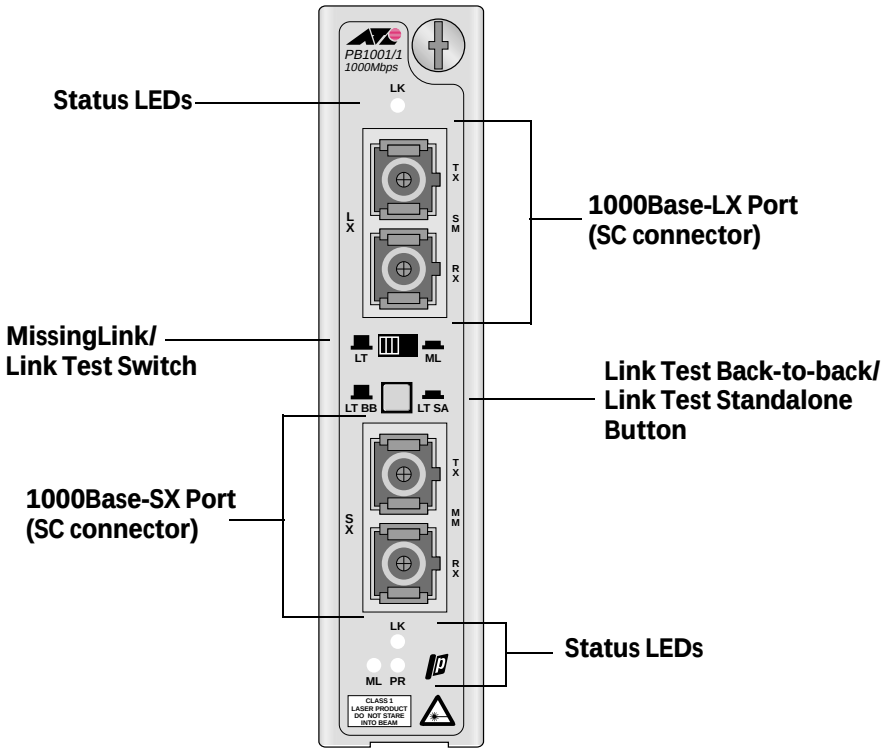

Figure 28 AT-PB1000 Series Media Converter

Table 23 lists the connector types and maximum distances for the AT-PB1000 Series Gigabit Media Converter modules.

Table 23 AT-PB1000 Series Maximum Cabling Distances

Model	1000Base-LX		1000Base-SX	
	Connector	Maximum Distance[1]	Connector	Maximum Distance[2]
AT-PB1001/1	SC	10 km (6.2 mi)	SC	550 m (1,804 ft)
AT-PB1001/2	SC	25 km (15.5 mi)	SC	550 m (1,804 ft)
AT-PB1001/3	SC	40 km (24.8 mi)	SC	550 m (1,804 ft)
AT-PB1001/4	SC	70 km (43.4 mi)	SC	550 m (1,804 ft)

1. Assumes 10/125 micron single-mode fiber optic cable.
2. Assumes 50/125 micron multimode fiber optic cable.

Status LEDs

Table 24 lists the status LEDs.

Table 24 AT-PB1000 Series Status LEDs

LED	Color	Description
PR	Green	Power is applied to the media converter.
ML	Green	The MissingLink feature is enabled.
	OFF	The MissingLink feature is disabled and the media converter is performing a link test.
LK	Green	A link has been established on the port.

Link Test Back-to-back/ Standalone Button

The Link Test Back-to-back/Standalone (LT BB/LT SA) button on the AT-PB1000 Series Media Converters is used together with the Link Test/MissingLink feature when performing a link test on the media converter. You use the LT BB/LT SA button to configure the module to match the topology in which you installed the module. The two possible network topologies for the media converter, back-to-back and standalone, are described in Network Topologies on page 49. The LT BB/LT SA button must be set correctly in order for a link test to be performed accurately. To perform a link test, refer to Troubleshooting on page 99.

Caution

AT-PB1000 Series Media Converters will not pass network traffic when a link test is being performed, thus possibly disrupting network operation. Only when the LT/ML button or switch is in the ML position will the media converter pass network traffic.

Cable Specifications

Table 25 lists the cabling specifications for the AT-PB1000 Series Media Converters.

Table 25 Fiber Optic Port Cabling Specifications

Model	Cable	Maximum Distance
1000Base-SX Port		
All Models	62.5/125 µm multimode fiber	275 m (902 ft)
	50/125 µm multimode fiber	550 m (1,804 ft)
1000Base-LX Port		
AT-PB1001/1	62.5/12 5 µm multimode fiber	550 m (1,804 ft)
	50/12 5 µm multimode fiber	550 m (1,804 ft)
	10/125 µm single-mode fiber	10 km (6.2 mi)
AT-PB1001/2	10/125 µm single-mode fiber	25 km (15.5 mi)
AT-PB1001/3	10/125 µm single-mode fiber	40 km (24.8 mi)[1]
AT-PB1001/4	10/125 µm single-mode fiber	70 km (43.4 mi)[1]

1. For maximum performance of Gigabit Optical Datalinks when greater than 40 km (24.8 mi) and operating within the 1550 nm optical spectrum, it is mandatory that the Single Mode Fiber (SMF) be rated as “non-dispersion-shifted,” “dispersion shifted,” or “non-zero dispersion shifted.”

Table 26 lists the port specifications for the AT-PB1000 Series modules.

Table 26 Fiber Optic Port Specifications

Model	Cable	Transmitter Output Power (average)	Wavelength	Minimum Receiver Sensitivity (average)
1000Base-SX Port				
All Models	50/125 or 62.5/125 µm multimode	-9.5 to -4.0 dBm	850 nm	-17.0 dBm
1000Base-LX Port				
AT-PB1001	10/125 µm single-mode	-9.5 to -3.0 dBm	1310 nm	-20.0 dBm
	50/125 or 62.5/125 µm multimode	-11.5 to -3.0 dBm	1310 nm	-20.0 dBm
AT-PB1001/2	10/125 µm single-mode	-3.0 to 0.0 dBm	1310 nm	-24.0 dBm
AT-PB1001/3[1]	10/125 µm single-mode	-5.0 to 0.0 dBm	1550 nm	-24.0 dBm
AT-PB1001/4[1]	10/125 µm single-mode	0.0 to 5.0 dBm	1550 nm	-24.0 dBm

1. For maximum performance of Gigabit Optical Datalinks when greater than 40 km (24.8 mi) and operating within the 1550 nm optical spectrum, it is mandatory that the Single Mode Fiber (SMF) be rated as “non-dispersion-shifted,” “dispersion shifted,” or “non-zero dispersion shifted.”

Installing a Media Converter

This section explains how to install a PowerBlade Media Converter module in the chassis. It is not necessary to power OFF the chassis to install a module.

To install a media converter module in the chassis, perform the following procedure:

1. Remove a blank faceplate from the chassis' front panel by loosening the thumbscrew. A media converter module can be installed in any expansion slot. See Figure 29.

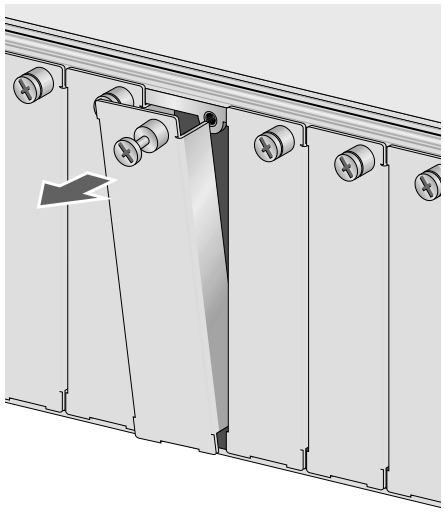

Figure 29 Removing a Blank Faceplate

Note
Do not remove a blank faceplate covering an expansion slot unless you intend to install a PowerBlade module.

2. Remove the module from the shipping package and store the packaging material in a safe location.

Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the PowerBlade module in the chassis. Failure to observe this caution could result in damage to the PowerBlade module.

3. For an AT-PB15 module, check the setting of the J5 jumper. If your chassis does not contain an AT-PBM02 management module, set the jumper to the Enabled (RIGHT) position. The default setting is Disabled (LEFT) indicating the management module is installed. Refer to Figure 23 on page 54 for the location of the jumper.

Note
If an AT-PBM02 management module is not installed in the chassis, the ML LED on the AT-PB15 module will not function properly.

4. For an AT-PB100 or AT-PB300 Series module, set the Auto-negotiation switch on the board to enable or disable auto-negotiation of the duplex mode. Refer to Auto-negotiation Switch on page 63 for the location of the switch.

5. Slide the module gently into place, aligning it with the guiderail, until it firmly connects to the chassis' backplane. See Figure 30.

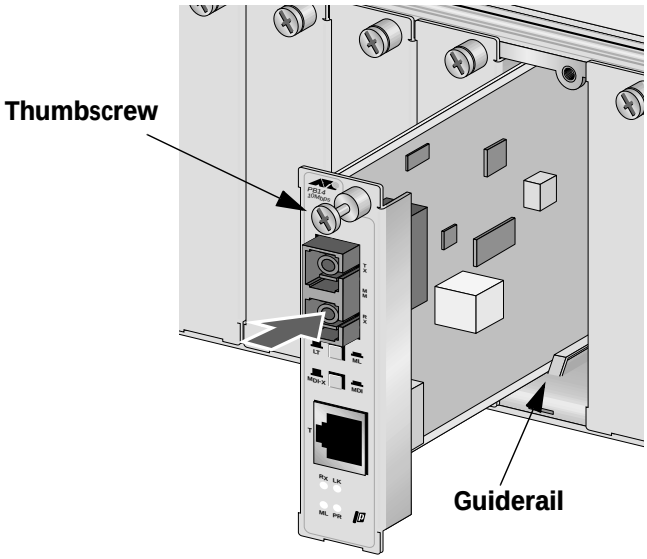

Figure 30 Installing a PowerBlade Module

6. Secure the module to the chassis by tightening the thumbscrew.

7. Verify that the PR LED on the front of the module is green. If the LED is OFF, refer to Troubleshooting on page 99.

8. Set the ML/LT to the Link Test (LT) position.

9. Remove the dust cover from the fiber optic port(s).

10. Connect the data cables to the ports on the module.

11. For an AT-PB10, AT-PB100 or AT-PB300 Series module, set the MDI/MD-X button to the appropriate setting. Refer to MDI/MDI-X on page 45 for information on this feature.

12. For an AT-PB1000 Series module, set the LT BB/LT SA button to back-to-back or standalone, depending on your topology. Refer to Link Test Back-to-back/ Standalone Button on page 71 for information on this feature.

13. Power ON the end-nodes.

Note
End-nodes connected to the media converter must operate with the same duplex mode (either both full-duplex or both half-duplex mode.)

14. Check that the LK LEDs on both ports are green. If the LEDs are OFF, refer to Troubleshooting on page 99.

15. If the link test is successful, set the ML/LT button to the MissingLink (ML) position. The ML LED should be green.

Caution
AT-PB1000 Series Media Converters will not pass network traffic when a link test is being performed, thus possibly disrupting network operation. Only when the LT/ML button or switch is in the ML position will the media converter pass network traffic.

The PowerBlade module is now ready for use. Repeat this procedure to install additional PowerBlade Media Converters.

Hot Swapping a Media Converter

To hot swap a media converter module, perform the following procedure:

1. Remove the data cables from the failed module.
2. Loosen the thumbscrew and gently slide out the failed module.
3. Remove the new module from the shipping package and store the packaging material in a safe location.

Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the PowerBlade module in the chassis. Failure to observe this caution could result in damage to the PowerBlade module.

4. Slide the module gently into place, aligning it with the guiderail, until it firmly connects to the chassis' backplane. See Figure 30.
5. Secure the new module to the chassis by tightening the thumbscrew.
6. Refer to Step 7 on page 74 to complete the installation.

Chapter 5
Installing a Switch Module

This chapter provides information on the features and functions of the PowerBlade Switch modules.

This chapter also contains the following procedures:

- ❑ Installing a Switch on page 89
- ❑ Hot Swapping a Switch on page 92

Overview

The PowerBlade Switches feature the following models:

- ❑ AT-PB201
- ❑ AT-PB202
- ❑ AT-PB202/1
- ❑ AT-PB202/2
- ❑ AT-PB202/3
- ❑ AT-PB202/4
- ❑ AT-PB204
- ❑ AT-PB205
- ❑ AT-PB206
- ❑ AT-PB207

The AT-PB200 and AT-PB202/x Series Switches are designed to interconnect LAN devices and subnetworks over large distances into an integrated network. These dual-port switches can also be used to improve the performance of your network by dividing the network into smaller, more manageable segments.

There are several different PowerBlade Switches you can “mix and match” in a chassis. The AT-PB200 and AT-PB202/x Series Switches have a 10/100Base-TX twisted pair port and a 100Base-FX fiber optic port. The twisted pair port has an RJ-45 connector and a maximum operating distance of 100 meters (328 feet). The fiber optic port has either a FJ, LC, MT-RJ, SC, ST, or VF-45 fiber optic connector and a maximum operating distance of 2 kilometers to 100 kilometers (62 miles), depending on the model.

The twisted pair port operates at 10/100 Mbps while the fiber optic port operates at 100 Mbps. Both ports feature half- or full-duplex operation.

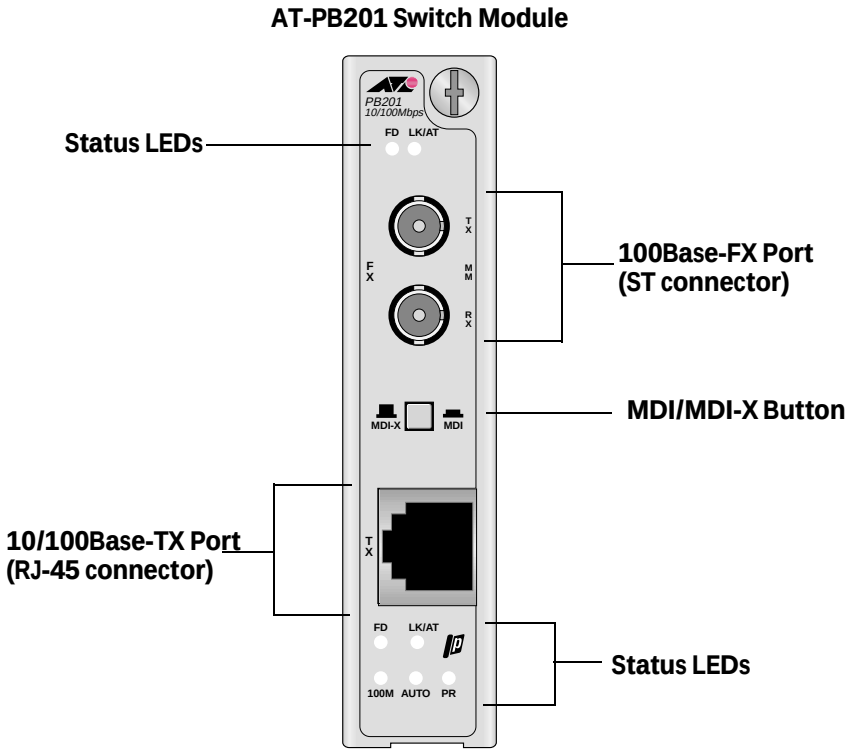

Figure 31 AT-PB200 Series Switch

Table 27 lists the connector types and maximum operating distances of the AT-PB200 and AT-PB202/x Series Switches.

Table 27 AT-PB200 and AT-PB202/x Series Maximum Operating Distances

Model	10/100Base-TX Port		100Base-FX Port	
	Connector	Maximum Distance[1]	Connector	Maximum Distance[2]
AT-PB201	RJ-45	100 m (328 ft)	ST	2 km (1.2 mi)
AT-PB202	RJ-45	100 m (328 ft)	SC	2 km (1.2 mi)
AT-PB202/1	RJ-45	100 m (328 ft)	SC	15 km (9.3 mi)
AT-PB202/2	RJ-45	100 m (328 ft)	SC	40 km (24.8 mi)
AT-PB202/3	RJ-45	100 m (328 ft)	SC	70 km (43.4 mi)
AT-PB202/4	RJ-45	100 m (328 ft)	SC	100 km (62 mi)
AT-PB204	RJ-45	100 m (328 ft)	VF-45	2 km (1.2 mi)
AT-PB205	RJ-45	100 m (328 ft)	MT-RJ	2 km (1.2 mi)
AT-PB206	RJ-45	100 m (328 ft)	LC	2 km (1.2 mi)
AT-PB207	RJ-45	100 m (328 ft)	FJ	2 km (1.2 mi)

1. Maximum distance can only be obtained when the UTP/STP cabling is installed and verified to TIA/EIA 568A Commercial Building Telecommunications Cabling Standard.
2. Maximum distance for 100 Mbps Optical Datalinks is dependent on the following factors: type of optical fiber, duplex mode of both end-nodes, and maximum optical loss budget for each of the optical fiber at the operating optical wavelength.

Features

The PowerBlade Switches have the following features:

- ❑ LEDs for unit and port status
- ❑ Half-duplex or full-duplex operation
- ❑ MDI/MDI-X button that eliminates the need for a crossover cable
- ❑ DIP switches for configuring the ports
- ❑ Data packet forwarding and filtering at full wire speed
- ❑ Store and forward switching mode
- ❑ Automatic address learning and aging

Switch Performance

The performance specifications are listed below:

- ❑ 148,800 pps for 100 Mbps and 14,880 pps for 10 Mbps for full wire speed forwarding and filtering
- ❑ 200 Mbps maximum throughput in 100 Mbps, full-duplex mode
- ❑ 20 Mbps maximum throughput in 10 Mbps, full-duplex mode
- ❑ Up to 8,192 unicast MAC addresses and unlimited multicast/broadcast addresses
- ❑ 280 kilobytes (per port) packet buffer
- ❑ Low latency 14.3 µs (64-byte packet, 100 Mbps full-duplex)

Frame Processing

The PowerBlade Switch modules support store and forward switching at Fast Ethernet full-wire speed either in 10 or 100 Mbps, half- or full-duplex mode. Packets entering each port are stored in buffers. After the full packet is received, it is forwarded or discarded depending on its destination address and error status. This ensures that only error-free data packets destined for another segment will be transferred across the switch, reducing network load. For example, if the packet entering from Port 1 is destined for an end station on Port 2, it will be forwarded if the Frame Check Sequence (FCS) is valid. If the packet from Port 1 is destined for an end station also attached to Port 1, then the packet is discarded.

The switch will discard CRC error, misaligned, runt, and under-sized/over-sized packets. When the packet has dribble bits at the end, the switch will truncate to octet boundary and check for a good FCS before forwarding.

Address Recognition and Filtering

Up to 4,000 MAC addresses can be stored in the MAC address table in the switch modules. The switch will learn all new addresses in real-time after power-up with its address self-learning mechanism. If the source address of an incoming packet is not found in the address table, the switch updates its MAC address table. Because the switch has Automatic Address Aging, if a source address entry in the table is not updated within five minutes, the entry is deleted from the table. The switch forwards all multicast, broadcast, and unicast packets when the MAC address table size is exceeded.

Status LEDs

Table 28 list the status LEDs.

Table 28 AT-PB200 and AT-PB202/x Series Status LEDs

LED	Color	Description
PR	Green	Power is applied to the switch.
FD	Green OFF	The switch is operating in full-duplex mode. The switch is operating in half-duplex mode.
LK/AT	Green Blinking	A link has been established on the port. Data is being transmitted or received on the port.
100M	Green OFF	The port is operating at 100 Mbps. The port is operating at 10 Mbps.
AUTO	Green	The 10/100Base-TX port is auto-negotiating.

MDI/MDI-X

An RJ-45 port on a 10 Mbps or 100 Mbps Ethernet network device can have one of two possible wiring configurations: MDI and MDI-X. The RJ-45 port on a PC, router or bridge is typically wired as MDI, while the twisted pair port on a switch or hub is usually MDI-X.

To connect two 10 Mbps or 100 Mbps network devices together that have dissimilar port wiring configurations, such as MDI to MDI-X, you use a straight-through cable. To connect two network devices that have an RJ-45 port with the same wiring configuration, such as MDI to MDI, you use a crossover cable.

The PowerBlade 10 Mbps and 100 Mbps switches that have an RJ-45 port feature an MDI/MDI-X button. You can use this button to configure the twisted pair port on the switch as either MDI or MDI-X, thus eliminating the need for a crossover cable regardless of the type of network device you are connecting to the unit.

Table 29 lists the pinouts of the RJ-45 ports for both MDI and MDI-X wiring configurations.

Table 29 RJ-45 Pinout

MDI		MDI-X	
Pin	**Signal**	**Pin**	**Signal**
1	TD +	1	RD+
2	TD-	2	RD-
3	RD+	3	TD+
6	RD-	6	TD-
4, 5, 7, 8	N/A	4, 5, 7, 8	N/A

DIP Switches

The DIP switches are used to manually configure the operating characteristics of the ports. These characteristics include the port speed, duplex mode, and auto-negotiation.

On the 100Base-FX fiber optic port, you can manually set the duplex mode to either half-duplex or full-duplex.

On the 10/100Base-TX twisted pair port, you can manually set the speed of the port to either 10 Mbps or 100 Mbps, set the duplex mode to either half-duplex or full-duplex and enable or disable auto-negotiation. Enabling auto-negotiation will automatically set the port's speed and duplex mode.

The DIP switches are located on the board. Refer to Figure 32.

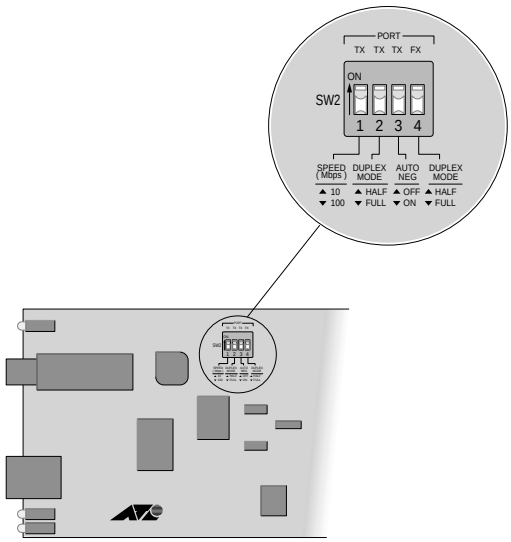

Figure 32 PowerBlade Switch Modules DIP Switches

When setting the DIP switches, consider the following:

- For a twisted pair port(s), setting the AUTO NEG switch to either ON or OFF enables or disables auto-negotiation on the port. If you disable auto-negotiation, be sure to set the DIP switches for the port's speed and duplex mode to match the speed and duplex mode of the end-node.
- For a fiber optic port, set the port's duplex mode using the appropriate DUPLEX MODE DIP switch. This setting must match the duplex mode capability of the end-node to be connected to the port.

J6 Jumper

The AT-PB200 and AT-PB202/x Series Switch modules feature a J6 jumper. There are two possible jumper settings: Enable and Disabled. If the chassis does not contain an AT-PBM02 management module, set the J6 jumper to the Enable (RIGHT) position. If the chassis contains an AT-PBM02 management module, set the J6 jumper to the Disabled (LEFT) position. Disabled is the factory default setting. Refer to Figure 33 for the location of the J6 jumper.

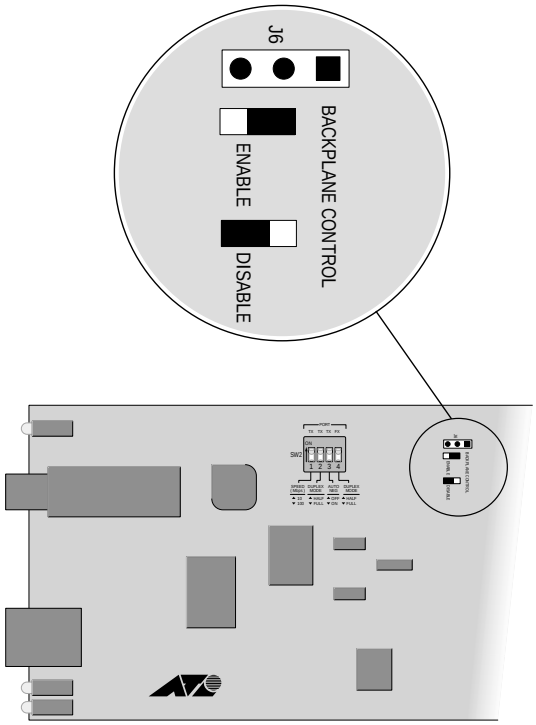

Figure 33 J6 Jumper Location

Network Topologies

Figure 34 shows a network configuration where an AT-PB202 switch module is used to interconnect two small networks of Ethernet hubs.

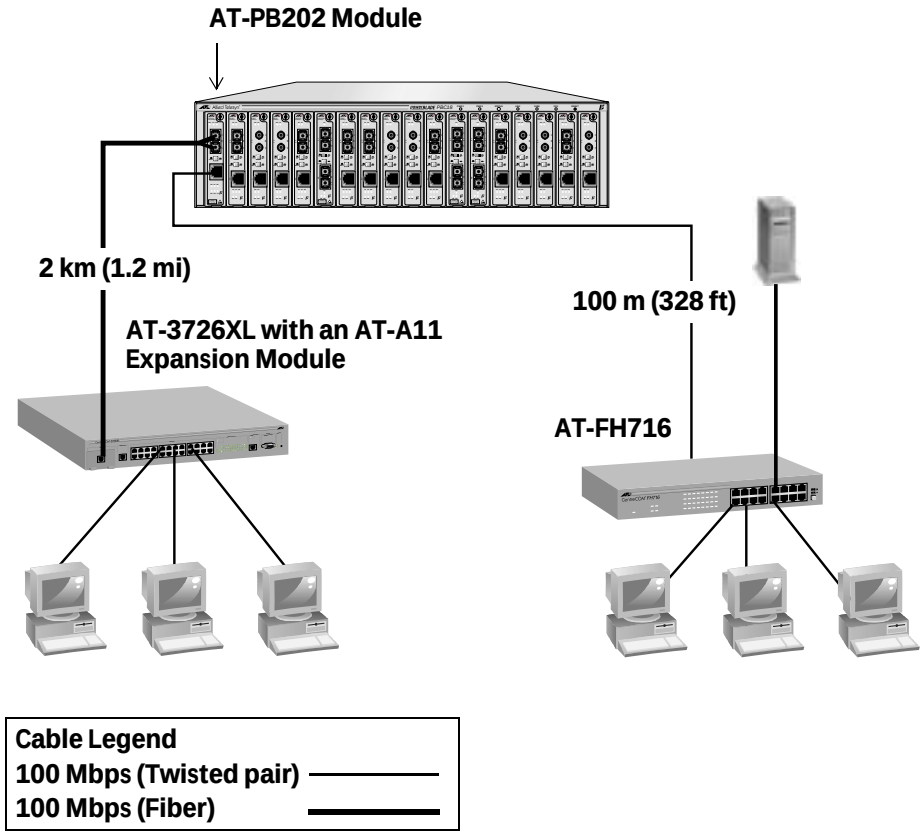

Figure 34 Example Configuration Using an AT-PB202 Switch

Cable Specifications

Table 30 lists the cable specifications for the 10/100Base-TX twisted pair port for all AT-PB200 and AT-PB202/x Series models.

Table 30 10/100Base-TX Twisted Pair Cabling Specifications

Operating Mode	Cable	Maximum Distance
10Base-T	Shielded or unshielded twisted pair Category 3 or better	100 m (328 ft)
100Base-TX	Shielded or unshielded twisted pair Category 5 or better	100 m (328 ft)

Table 31 lists the cable specifications for the 100Base-FX fiber optic port for all AT-PB200 and AT-PB202/x Series models when operating in full-duplex mode.

Table 31 100Base-FX Cabling Specifications (Full-duplex)

Model	Cable	Maximum Distance	Maximum Allowable Loss Budget
AT-PB201 AT-PB202 AT-PB204 AT-PB205 AT-PB206 AT-PB207	50/125 or 62.5/125 µm multimode	2 km (1.2 mi)	13 dB at 1310 nm
AT-PB202/1	9/125 µm single-mode	15 km (9.3 mi)	16 dB at 1310 nm
AT-PB202/2	9/125 µm single-mode	40 km (24.8 mi)	30 dB at 1310 nm
AT-PB202/3	9/125 µm single-mode	70 km (43.4 mi)	37 dB at 1310 nm
AT-PB202/4	9/125 µm single-mode[1]	100 km (62 mi)	37 dB at 1310 nm

1. The cable can be non-dispersion-shifted, dispersion-shifted, or non-zero dispersion-shifted single-mode fiber optic cable.

Table 32 lists the cable specifications for the 100Base-FX fiber optic port for all AT-PB200 and AT-PB202/x Series models when operating in half-duplex mode.

Table 32 100Base-FX Fiber Optic Ports (Half-duplex)[1]

Number of Media Converters	Connected Devices	Maximum Distance
One Media Converter Inline	Switch to switch	372 m (1,221 ft)
	Workstation to switch	372 m (1,221 ft)
	Switch to Class I repeater	137 m (450 ft)
	Switch to Class II repeater	185 m (607 ft)
Two Media Converters Inline	Switch to switch	332 m (1,089 ft)
	Workstation to switch	322 m (1, 089 ft)
	Switch to Class I repeater	97 m (318 ft)
	Switch to Class II repeater	145 m (476 ft)

1. The total distance of the fiber optic lengths cannot exceed the limits stated in the table. Each media converter used inline within a single collision domain reduces the overall segment length by 40 m (131 ft).

Table 33 through Table 36 list the port specifications for the 100Base-FX fiber optic port.

Table 33 Fiber Optic Transmitter

Model	Fiber Optic Diameter	Optical Frequency	Launch Power[1]		
			Maximum	Average	Minimum
AT-PB201 AT-PB202 AT-PB204 AT-PB205 AT-PB206 AT-PB207	50/125 µm multimode	1310 nm	-14.0 dBm	-20.3 dBm	-22.5 dBm
	62.5/125 µm multimode	1310 nm	-14.0 dBm	-16.8 dBm	-19.0 dBm
AT-PB202/1	9/125 µm single-mode	1310 nm	-8.0 dBm	-11.5 dBm	-15.0 dBm
AT-PB202/2	9/125 µm single-mode	1310 nm	0.0 dBm	-3.0 dBm	-5.0 dBm
AT-PB202/3	9/125 µm single-mode	1310 nm	3.0 dBm	0.0 dBm	-3.0 dBm
AT-PB202/4	9/125 µm single-mode	1310 nm	5.0 dBm	-2.5 dBm	0.0 dBm

1. The launch power is measured at one meter from the transmitter.

Table 34 Fiber Optic Receiver

Model	Fiber Optic Diameter	Optical Frequency	Receive Power		
			Minimum Sensitivity	Typical Sensitivity	Saturation
AT-PB201 AT-PB202 AT-PB204 AT-PB205 AT-PB206 AT-PB207	50/125 or 62.5/125 µm multimode	1310 nm	-31.8 dBm	-34.5 dBm	-14.0 dBm
AT-PB202/1	9/125 µm single-mode	1310 nm	-31.0 dBm	-31.0 dBm	-8.0 dBm
AT-PB202/2	9/125 µm single-mode	1310 nm	-35.0 dBm	-38.0 dBm	0.0 dBm
AT-PB202/3	9/125 µm single-mode	1310 nm	0.0 dBm	-39.0 dBm	-3.0 dBm
AT-PB202/4	9/125 µm single-mode	1310 nm	0.0 dBm	-39.0 dBm	-3.0 dBm

Table 35 Fiber Optic Datalink

Model	Fiber Optic Diameter	Optical Frequency	Minimum Power/ Link Budget	Average Signal Loss	Minimum Distance Specs[1]	Maximum Distance Specs.
AT-PB201 AT-PB202 AT-PB204 AT-PB205 AT-PB206 AT-PB207	50/125 µm multimode	1310 nm	13.00 dB	18.70 dB	0	2 km (1.2 mi)
	62.5/125 µm multimode	1310 nm	16.80 dB	22.50 dB	0	2 km (1.2 mi)
AT-PB202/1	9/125 µm single-mode	1310 nm	16.00 dB	10.3 dB	0	15 km (9.3 mi)
AT-PB202/2	9/125 µm single-mode	1310 nm	30.00 dB	20.8 dB	0	40 km (24.8 mi)
AT-PB202/3	9/125 µm single-mode	1310 nm	33.0 dB	33.4 dB	15 km (9.4 mi)	75 km (46 mi)
AT-PB202/4	9/125 µm single-mode	1310 nm	34.0 dB	46.0 dB	40 km (24.8 mi)	100 km (62 mi)

1. The recommended minimum range is stated in all cases where the maximum transmitter output power exceeds the receivers saturation level. This is to prevent blinding or burning out of the optical receiver on the far end-node.

Note
The recommended minimun range is stated in all cases where the maximum transmitter output power exceeds the receivers saturation level. This is to prevent blinding or burning out of the optical receiver on the far end-node.

Table 36 Fiber Optic Loss Specification (Benchmarks)

Fiber Type	Fiber Optic Diameter	Optical Frequency	Typical Loss Factor	Worst Case Loss Factor	Bandwidth
MMF	50/125 µm	1310 nm	1.00 dB	1.50 dB	400
	62.5/125 µm	1310 nm	1.00 dB	1.50 dB	500
SMF	9/125 µm	1310 nm	0.40 dB	1.00 dB	Not applicable
	9/125 µm	1550 nm	0.30 dB	0.75 dB	Not applicable

Installing a Switch

This section explains how to install a PowerBlade Switch in the chassis. It is not necessary to power OFF the chassis to install the switch.

Be sure to observe the following guidelines when planning the installation of the AT-PB200 and AT-PB202/x Series Switch.

- ❑ The end-node connected to the fiber optic port on an AT-PB200 or AT-PB202/x Series Switch must be able to operate at 100 Mbps.
- ❑ The end-node connected to the twisted pair port(s) can operate at either 10 Mbps or 100 Mbps.

To install the switch, perform the following procedure:

1. Remove a blank faceplate from an empty expansion slot on the front of the chassis. The module can be installed in any expansion slot. See Figure 35.

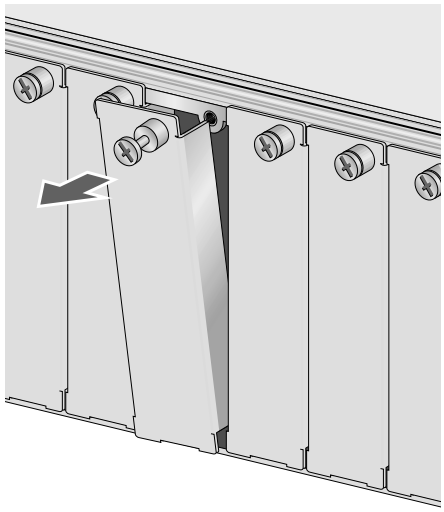

Figure 35 Removing a Blank Faceplate

Note
Do not remove a blank faceplate covering an expansion slot unless you intend to install a PowerBlade module.

2. Remove the module from the shipping package and store the packaging material in a safe place.

⚠ Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the PowerBlade module in the chassis. Failure to observe this caution could result in damage to the PowerBlade module.

3. Check the setting of the J6 jumper. If the chassis does not contain an AT-PBM02 management module, set the jumper to Enabled (RIGHT). The factory default setting is Disabled (LEFT) indicating that an optional management module is installed. See Figure 33 on page 83 for the location of the jumper.

   Note
   If you have an earlier version of an AT-PB200 or AT-PB202/x Series Switch (without a J6 jumper) and are using an AT-PBM02 management module to manage the chassis, the ML LED on the switch may not function properly.

4. Configure the DIP switches. Refer to Table 37 for the possible settings and Figure 32 for the location of the DIP switches. See DIP Switches on page 82 for additional information.

Table 37 DIP Switch Settings for the PowerBlade Switch Modules

DIP Switch Number	Port[1]	Setting	Position	Description
1	TX	Speed (Mbps)	UP	The twisted pair port is operating at 10 Mbps.
			DOWN	The twisted pair port is operating at 100 Mbps.
2	TX	Duplex Mode	UP	The twisted pair port is operating at half-duplex.
			DOWN	The twisted pair port is operating at full-duplex.
3	TX	Auto Neg	UP	Auto-negotiation on the twisted pair port is OFF.
			DOWN	Auto-negotiation on the twisted pair port is ON.
4	FX	Duplex Mode	UP	The fiber optic port is operating at half-duplex mode.
			DOWN	The fiber optic port is operating at full-duplex mode.

1. TX = Twisted Pair Port / FX = Fiber Optic Port.

5. Slide the module into the expansion slot, aligning it with the guiderails, until it firmly connects to the chassis' backplane.

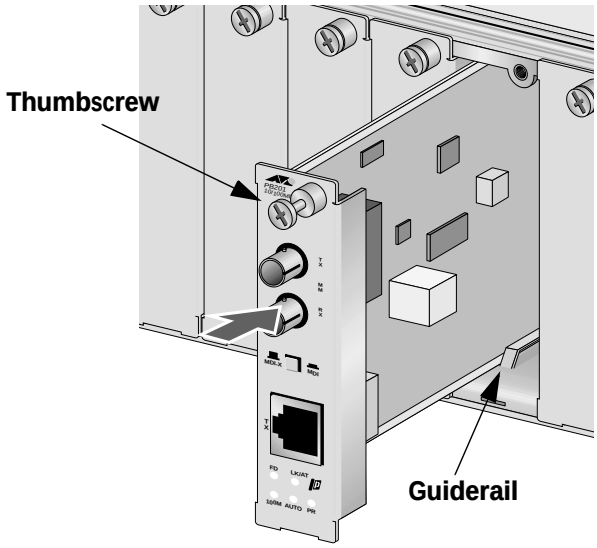

Figure 36 Installing a AT-PB200 Series Module

6. Secure the module to the chassis by tightening the thumbscrew.
7. Verify that the PR LED is green. If the LED is OFF, refer to Troubleshooting on page 99.
8. Remove the dust cover from the fiber optic port and attach the fiber optic cable to the 100Base-FX port. Make sure that the cable connected to the fiber optic receiver port on the switch is connected to the transmitter port on the remote end-node and that the fiber optic transmitter port on the switch is connected to the receiver port on the end-node.
9. Attach the twisted pair cable to the 10/100Base-TX port.
10. Set the MDI/MDI-X switch to the appropriate setting. Refer to MDI/MDI-X on page 81 for information on this feature.
11. Power ON the end-nodes.
12. Check that the LK LED on both ports are green. If the LEDs are OFF, refer to Troubleshooting on page 99.

The PowerBlade module is now ready for use. Repeat this procedure to install additional PowerBlade Switches.

Hot Swapping a Switch

To hot swap a module, perform the following procedure:

1. Remove the data cables from the failed module.
2. Loosen the thumbscrew and gently slide out the failed module.
3. Remove the new module from the shipping package and store the packaging material in a safe location.

> **Caution**
> Wear a grounding device and observe electrostatic discharge precautions when installing the PowerBlade module in the chassis. Failure to observe this caution could result in damage to the PowerBlade module.

4. Slide the module gently into place, aligning it with the guiderails, until it firmly connects to the chassis' backplane. Refer to Figure 36 on page 91.
5. Secure the new module to the chassis by tightening the thumbscrew.
6. Refer to Step 7 on page 91 to complete the installation.

Chapter 6
Installing an Optional Management Module

This chapter describes the features and functions of the PowerBlade Optional Management Module. This chapter also provides the procedure for:

- Installing an Optional Management Module on page 96

Overview

The AT-PBM02 is an optional management module for the PowerBlade PBC18. When installed, the management module allows you to monitor the operating status of the media converters and switches installed the chassis. The management module is not required for normal network operations, but it is necessary if you want to locally or remotely monitor and configure the modules installed in the chassis and the ports on the modules.

The management module features a RS-232 terminal port with a DB9 connector. The terminal port is used for local management. The AT-PBM02 also features a 10Base-T twisted pair port with an RJ-45 connector. The twisted pair port is used for remote management. The RJ-45 has a maximum operating distance of 100 meters (328 feet) and supports 10 Mbps half-duplex operation.

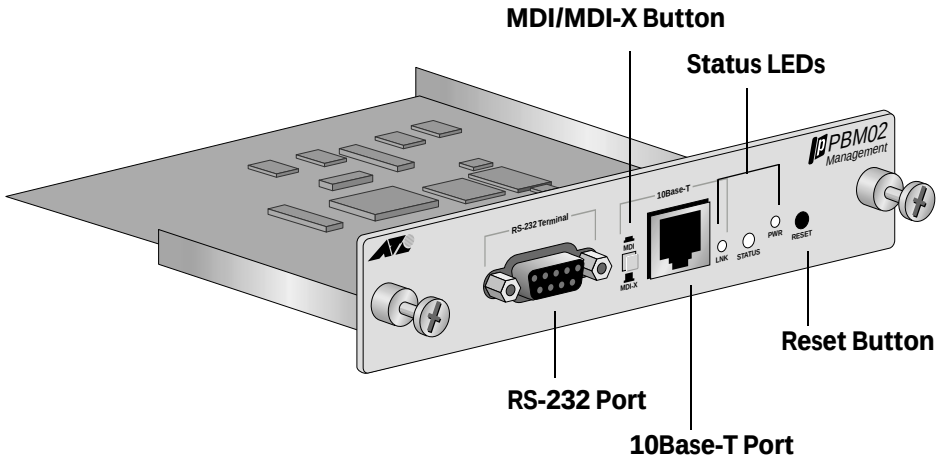

Figure 37 AT-PBM02 Management Module

The AT-PBM02 has a Link, Power, and Status LED as well as a Reset button. The LEDs and the Reset button are duplicated on the front of the chassis for easy monitoring or to reset the management module.

Features

The AT-PBM02 management module allows you to do the following:

- ❑ Check chassis status
  - — Main and redundant power supply status
  - — Identify the PowerBlade modules
- ❑ Check module status
  - — Enable or disable MissingLink
  - — LED status for each port
  - — Half-duplex and full-duplex status
- ❑ Download a new version of the management modules' firmware

Status LEDs

Table 38 lists the status LEDs.

Table 38 AT-PBM02 Status LEDs

LED	Color	Description
PWR	Green	Power is applied to the management module.
LNK	Green	A link has been established on the RJ-45 port.
Status	Amber	A self-test is being performed.
	Flashing Amber	The module is downloading the firmware from a host PC.
	Red	The module or management software has malfunctioned.
	Green	The module is installed and online.

Reset Button

The Reset button allows you to reset the management module. You may need to reset the module after completing the installation, adding or swapping a power supply, or after upgrading the modules' firmware.

Caution
Using the Reset button will not interrupt network operations, except for the 100 Mbps PowerBlade Series Modules.

Cable Specifications

Table 39 list the connector types and maximum distances for the AT-PBM02.

Table 39 AT-PBM02 Cabling Specifications

Port	Connector	Cable	Maximum Distance
RS-232	DB9	RS-232 Straight-through	Not applicable
10Base-T	RJ-45	Shielded or unshielded twisted pair Category 3 or better	100 m (328 ft)

Installing an Optional Management Module

To install an optional management module, perform the following procedure:

Warning
Installing an optional management module while the chassis is powered ON could result in damage to the module.

1. Power OFF the chassis by performing one of the following:

   - ❑ For an AC model, unplug the power cord from the power outlet and then unplug the power cord for the chassis.
   - ❑ For a DC model, follow the steps below:

Warning
When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last. 18

   a. Remove the positive and negative feed wires from the terminal block by loosening the screws to the wire connections with a flathead screwdriver.

   b. Remove the frame ground wire from the terminal block by loosening the screw to the wire connection with a flathead screwdriver.

2. Remove the blank faceplate covering the management module expansion slot by loosening the two thumbscrews. See Figure 38.

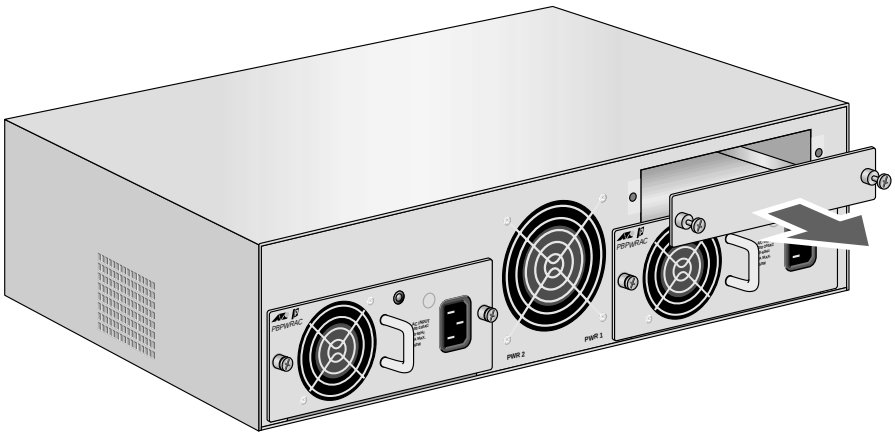

Figure 38 Removing the Management Module Blank Faceplate

3. Remove the management module from the shipping package and store the packaging material in a safe place.

Caution
Wear a grounding device and observe electrostatic discharge precautions when installing the PowerBlade module in the chassis. Failure to observe this caution could result in damage to the PowerBlade module.

4. Slide the management module gently into place, seating the module's connectors into the chassis' backplane. See Figure 39.

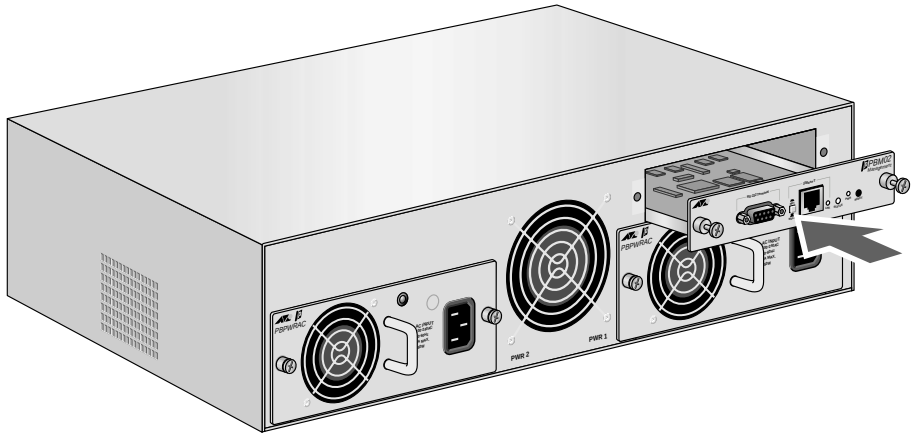

Figure 39 Installing a Management Module

5. Secure the management module to the chassis by tightening the two thumbscrews.

6. Apply power to the chassis by connecting the AC power cord or DC wires. Refer to Step 5 on page 36 for an AC unit or Step 6 on page 36 for a DC unit.

7. Check to be sure that the Status and PWR LED on the front of the management module are green.

8. For local management, attach one end of an RS-232 cable with a DB9 connector to the RS-232 port on the management module and the other end of the cable to a terminal or PC with a terminal emulator program.

9. For remote management, connect a Category 3 or better twisted pair cable with an RJ-45 connector to the 10Base-T port on the management module and connect the other end of the cable to a 10 Mbps or a 10/100 Mbps port on an Ethernet hub or switch.

10. Set the MDI/MDI-X switch for the 10Base-T port. If the 10Base-T port is connected to an Ethernet hub or switch, the correct setting for the switch is probably the MDI (IN) position.

The management module is now ready to be configured. To manage and configure the PowerBlade Optional Management Module, refer to the **AT-S31 User's Guide**. This guide can be downloaded for Allied Telesyn's web site at: www.alliedtelesyn.com.

Chapter 7
Troubleshooting

Follow the guidelines in this section to test and troubleshoot the installation in the event a problem occurs.

Chassis

Verify that the PWR1 main power supply and PWR2 optional power supply LEDs are green. If one of the LEDs is OFF, do the following:

- ❑ Check to be sure that the power supply is securely connected to the power outlet.
- ❑ Check to be sure that the power supply is securely seated in the chassis.
- ❑ For a DC unit, check to be sure that the wires are connected to the correct terminals.
- ❑ Check to be sure that the fans are operating. If a fan is not operating, it is likely that a power supply has failed.

Media Converter or Switch Module

If the PR LED on the module is OFF, do the following:

- ❑ Check that the module is securely seated in the chassis.
- ❑ Check that the chassis is receiving power.
- ❑ Try installing the module in another expansion slot.

If a LK LED on the module is OFF, do the following:

- ❑ Check that the end-node connected to the port is ON.
- ❑ Check to be sure that the cable is securely connected to the ports on the module and on the end-node.
- ❑ Check to be sure that the appropriate type of cable for the port is being used.
- ❑ For the fiber optic port, check that the maximum allowable loss budget has not been exceeded.

If the LK LED is green but there is a communication problem between the end-nodes connected to the module (and you are not running a link test), check the following:

- ❑ For a media converter module, check to be sure that the end-nodes connected to the ports are operating at the same speed and at a speed appropriate for the PowerBlade model.
- ❑ For a media converter module, check that the end-nodes are operating in the same duplex mode.
- ❑ For a media converter module, check that the Link Test/MissingLink button is in the M/L ON (IN) position.
- ❑ Check that the maximum allowable loss budget for the fiber optic cable has not been exceeded.
- ❑ For a switch module, check to be sure that the DIP switches are set correctly.

Optional Management Module

If an optional management module is install and a local management session cannot be established, do the following:

- ❑ Check to be sure the management module is securely seated in the chassis.
- ❑ Verify that you are using a straight-through RS-232 cable.
- ❑ Check to be sure that the RS-232 cable is securely connected to the RS-232 port on the management module and the other end is connected to a terminal or PC.
- ❑ Verify that the operating parameters for the terminal or the terminal emulator program are configured correctly. The default values for the RS-232 port can be found in the **AT-S31 User's Guide**. This guide is available at www.alliedtelesyn.com.

If an optional management module is installed and a remote management session cannot be established, do the following:

- ❑ Check to be sure the management module is securely seated in the chassis.
- ❑ Verify that the twisted pair cable is Category 3 or better and that it does not exceed 100 meters (328 feet).
- ❑ Check to be sure that the twisted pair cable is securely connected to the RJ-45 port on the management module and the other end is connected to a 10Base-T or 10/100Base-TX port on an Ethernet hub or switch.
- ❑ Verify that an IP address has been assigned to the management module and you are using the same IP address at the start of the remote session. Refer to the **AT-S31 User's Guide** for instructions on assigning an IP address.
- ❑ If the LNK LED is OFF, change the setting of the MDI/MDI-X switch on the management module.
- ❑ Ping the chassis from a workstation using a PING utility. If a ping fails, either the chassis is not operating, the physical data path to the chassis has experienced a failure, or the wrong IP address was entered.
- ❑ Reset the management module by pressing and holding either the Reset button on the front of the chassis or on the management module for about 1 second. The Status LED will flash once, after which the management module is ready for use.

Caution
Using the Reset button will briefly interrupt network operations on 100 Mbps PowerBlade Series Modules.

For additional troubleshooting guidelines for a PowerBlade Management Module, refer to the **AT-S31 User's Guide**.

If you are still experiencing problems after testing and troubleshooting the installation, contact Allied Telesyn Technical Support for assistance. Refer to Contacting Allied Telesyn Technical Support on page 13 or visit our web site at www.alliedtelesyn.com for support information.

Appendix A

Technical Specifications

Physical Characteristics

Dimensions:	W x D x H 44.1 cm x 48.3 cm x 1.7 cm (17.3 in x 19 in x 4.4 in)
Weight:	7.65 kg (17 lbs)
Maximum Operating Temperature:	0° C to 50° C (32° F to 122° F)
Maximum Storage Temperature:	-25° C to 70° C (-13° F to 158° F)
Humidity:	5% to 95% maximum (non-condensing)

Power Requirements

Input Supply Voltage	
AC:	100 to 240 V AC, 4.0/2.0A maximum
DC:	48 V DC, 5A maximum
AC Input Frequency:	50/60 Hz

Agency Certifications

RFI Emission:	EN55022 Class A, EN610003-2, EN61000-3-3
Immunity:	EN55024
Electrical Safety:	EN 60950, UL1950 (UL/cUL)
Laser:	EN60825

Appendix B

Translated Safety Information

Important: This appendix contains multiple-language translations for the safety statements in this guide.

Wichtig: Dieser Anhang enthält Übersetzungen der in diesem Handbuch enthaltenen Sicherheitshinweise in mehreren Sprachen.

Vigtigt: Dette tillæg indeholder oversættelser i flere sprog af sikkerhedsadvarslerne i denne håndbog.

Belangrijk: Deze appendix bevat vertalingen in meerdere talen van de veiligheidsopmerkingen in deze gids.

Important: Cette annexe contient la traduction en plusieurs langues des instructions de sécurité figurant dans ce guide.

Tärkeää: Tämä liite sisältää tässä oppaassa esiintyvät turvaohjeet usealla kielellä.

Importante: questa appendice contiene traduzioni in più lingue degli avvisi di sicurezza di questa guida.

Viktig: Dette tillegget inneholder oversettelser til flere språk av sikkerhetsinformasjonen i denne veiledningen.

Importante: Este anexo contém traduções em vários idiomas das advertências de segurança neste guia.

Importante: Este apéndice contiene traducciones en múltiples idiomas de los mensajes de seguridad incluidos en esta guía.

Obs! Denna bilaga innehåller flerspråkiga översättningar av säkerhetsmeddelandena i denna handledning.

Standards: This product meets the following standards.

U.S. Federal Communications Commission

Radiated Energy

Note: This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: Modifications or changes not expressly approved of by the manufacturer or the FCC, can void your right to operate this equipment.

Industry Canada

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

1 RFI Emission EN55022 Class A, EN61000-3-2, EN61000-3-3

2 **Warning**: In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

3 Immunity EN55024

4 Electrical Safety EN60950, UL1950, CSA 950

5 Laser EN60825

Safety

6 **Warning:** Class 1 Laser product.

7 **Warning:** Do not stare into the laser beam.

8 **Electrical Notices**
Warning: Electric Shock Hazard
To prevent electric shock, do not remove the cover. No user-serviceable parts inside. This unit contains hazardous voltages and should only be opened by a trained and qualified technician. To avoid the possibility of electric shock, disconnect electric power to the product before connecting or disconnecting the LAN cables.

9 **Lightning Danger**
Danger: Do not work on equipment or cables during periods of lightning activity.

10 **Caution:** Power cord is used as a disconnection device. To de-energize equipment, disconnect the power cord.

11 Electrical - Type Class 1 Equipment
This equipment must be earthed. Power plug must be connected to a properly wired earth ground socket outlet. An improperly wired socket outlet could place hazardous voltages on accessible metal parts.

12 Pluggable Equipment, the socket outlet shall be installed near the equipment and shall be easily accessible.

13 **Caution:** Air vents must not be blocked and must have free access to the room ambient air for cooling.

14 **Operating Temperature:** This product is designed for a maximum ambient temperature of 40° degrees C.

15 **All Countries:** Install product in accordance with local and National Electrical Codes.

16 As a safety precaution, a 10 Amp circuit breaker should be installed at the supply end of the cable to be used with this LAN equipment.

Always connect the wiring to the LAN equipment first before connecting the wiring to the breaker. To avoid the danger of physical injury from electrical shock, do not work with HOT feeds. Always be sure that the breaker is in the OFF position before connecting the wiring to the breaker.

17 **Warning**: Do not strip more than the recommended amount of wire. Stripping more than the recommended amount can create a safety hazard by leaving exposed wire on the terminal block after installation.

18 When installing this equipment, always ensure that the frame ground connection is installed first and disconnected last.

19 **Caution**: "Safety Hazard" Check to see if there are any exposed copper strands coming from the installed wire. When this installation is done correctly there should be no exposed copper wire strands extending from the terminal block. Any exposed wiring can conduct harmful levels of electricity to persons touching the wires.

20 This system will work with Positive grounded or Negative Grounded DC systems.

21 Lithium Battery - Should only be changed by trained and qualified technician.
Caution: Danger of explosion if battery incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

(Attention: IL y a danger d'explosion s'ily y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rébut les batteries usagés conformement aux instructions du fabricant).

Normen: Dieses Produkt erfüllt die Anforderungen der nachfolgenden Normen.

1	Hochfrequenzstörung	EN55022 Klasse A, EN61000-3-2, EN61000-3-3
2	**Warnung**: Bei Verwendung zu Hause kann dieses Produkt Funkstörungen hervorrufen. In diesem Fall müßte der Anwender angemessene Gegenmaßnahmen ergreifen.	
3	Störsicherheit	EN55024
4	Elektrische Sicherheit	EN60950, UL1950, CSA 950
5	Laser	EN60825

Sicherheit

6 **Warnung:** Laserprodukt der Klasse 1.

7 **Warnung:** Nicht direkt in den Strahl blicken.

8 **Achtung:** GEFÄHRLICHE SPANNUNG
Das Gehäuse nicht öffnen. Das Gerät enthält keine vom Benutzer wartbaren Teile. Das Gerät steht unter Hochspannung und darf nur von qualifiziertem technischem Personal geöffnet werden. Vor Anschluß der LAN-Kabel, Gerät vom Netz trennen.

9 **Gefahr Durch Blitzschlag**
Gefahr: Keine Arbeiten am Gerät oder an den Kabeln während eines Gewitters ausführen.

10 **Vorsicht:** DAS NETZKABEL DIENT ZUM TRENNEN DER STROMVERSORGUNG. ZUR TRENNUNG VOM NETZ, KABEL AUS DER STECKDOSE ZIEHEN.

11 GERÄTE DER KLASSE 1
DIESE GERÄTE MÜSSEN GEERDET SEIN. Der Netzstecker darf nur mit einer vorschriftsmäßig geerdeten Steckdose verbunden werden. Ein unvorschriftsmäßiger Anschluß kann die Metallteile des Gehauses unter gefährliche elektrische Spannungen setzen.

12 Steckbares Gerät: Die Anschlußbuchse sollte in der Nähe der Einrichtung angebracht werden und leicht zugänglich sein."

13 **Vorsicht**
Die Entlüftungsöffnungen dürfen nicht versperrt sein und müssen zum Kühlen freien Zugang zur Raumluft haben.

14 **Betriebstemperatur:** Dieses Produkt wurde für den Betrieb in einer Umgebungstemperatur von nicht mehr als 40° C entworfen.

15 **Alle Länder:** Installation muß örtlichen und nationalen elektrischen Vorschriften entsprechen.

16 **Warnung**: Aus Sicherheitsgründen sollte am Netzteilende des mit dieser LAN-Einrichtung verwendeten Kabels ein 10-Ampere-Leistungsschalter installiert werden.

Nehmen Sie STETS zuerst die Verkabelung der LAN-Einrichtung vor, bevor Sie die Kabel an den Leistungsschalter anschließen. Arbeiten Sie nie mit SPANNUNGSFÜHRENDEN Kabeln, um Körperverletzungen durch Stromschlag zu vermeiden. Achten Sie stets darauf, daß sich der Leistungsschalter in der Position OFF (Aus) befindet, bevor Sie Kabel an den Leistungsschalter anschließen.

17 **Warnung**: Ziehen Sie nicht mehr als die empfohlene Drahtlänge ab. Wird mehr als die empfohlene Länge abisoliert, stellt dies ein Sicherheitsrisiko dar, da auf dem Anschlußklemmblock nach der Installation möglicherweise freiliegende Drähte verbleiben.

18 **Warnung**: Bei der Installation dieser Einrichtung ist stets sicherzustellen, daß der Masseanschluß jeweils zuerst installiert und zuletzt getrennt wird.

19 **Vorsicht**: “Sicherheitsrisiko” Prüfen Sie, daß aus dem installierten Draht keine freiliegenden Kupferlitzen herausragen. Bei korrekter Installation sollten aus dem Anschlußklemmblock keine freiliegenden Kupferlitzen vorstehen. Freiliegende Kabel führen genug Spannung, um Personen zu gefährden, die diese Drähte berühren.

20 **Hinweis**: Dieses System kann mit positiv geerdeten oder negativ geerdeten Gleichstromsystemen betrieben werden.

21 Lithium-Batterie - Sollte nur von einem geschulten qualifizierten Techniker ausgetauscht werden.
Vorsicht: Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Nur mit einer gleichen Batterie oder einem gleichwertigen Batterietyp nach Empfehlung des Herstellers ersetzen. Gebrauchte Batterien nach Anweisungen des Herstellers beseitigen.

Standarder: Dette produkt tilfredsstiller de følgende standarder.

✍ **1** Radiofrekvens forstyrrelsesemissionEN55022 Klasse A, EN61000-3-2, EN61000-3-3

✍ **2** **Advarsel**: let hjemligt miljø kunne dette produkt forårsage radio forstyrrelse. Bliver det tilfældet, påkræves brugeren muligvis at tage tilstrækkelige foranstaltninger.

✍ **3** Immunitet EN55024

✍ **4** Elektrisk sikkerhed EN60950, UL1950, CSA 950

✍ **5** Laser EN60825

Sikkerhed

✍ **6** **Advarsel:** Laserprodukt av klasse 1.

✍ **7** **Advarsel**: Stirr ikke på strålen.

✍ **8** **Elektriske Forholdsregler**
Advarsel: RISIKO FOR ELEKTRISK STØD
For at forebygge ELEKTRISK stød, undlad at åbne apparatet. Der er ingen indre dele, der kan repareres af brugeren. Denne enhed indeholder LIVSFARLIGE STRØMSPÆNDINGER og bør kun åbnes af en uddannet og kvalificeret tekniker. For at undgå risiko for ELEKTRISK STØD, afbrydes den elektriske strøm til produktet, før LAN-kablerne monteres eller afmonteres.

✍ **9** **Fare Under Uvejr**
Fare: UNDLAD at arbejde på udstyr eller KABLER i perioder med LYNAKTIVITET.

✍ **10** **Advarsel:** Den strømførende ledning bruges til at afbryde strømmen. Skal strømmen til apparatet afbrydes, tages ledningen ud af stikket.

✍ **11** ELEKTRISK - KLASSE 1-UDSTYR
DETTE UDSTYR KRÆVER JORDFORBINDELSE. Stikket skal være forbundet med en korrekt installeret jordforbunden stikkontakt. En ukorrekt installeret stikkontakt kan sætte livsfarlig spænding til tilgængelige metaldele.

✍ **12** Udstyr Til Stikkontakt, stikkontakten bør installeres nær ved udstyret og skal være lettilgængelig.

✍ **13** **Advarsel:** Ventilationsåbninger må ikke blokeres og skal have fri adgang til den omgivende luft i rummet for afkøling.

✍ **14** **Betjeningstemperatur:** Dette apparat er konstrueret til en omgivende temperatur på maksimum 40 grader C.

✍ **15** **Alle Lande:** Installation af produktet skal ske i overensstemmelse med lokal og national lovgivning for elektriske installationer.

✍ **16** **Advarsel**: Der bør indskydes en 10 A automatsikring på forsyningsenden af kablet til dette LAN-udstyr.

Man skal ALTID først forbinde ledningerne med LAN-udstyret inden de forbindes med automatsikringen. Ved ledningsarbejde skal strømmen altid være AFBRUDT til forebyggelse af fare for elektrisk stød. Man skal altid SLUKKE automatsikringen inden man forbinder ledninger med den.

✍ **17** **Advarsel**: Man bør ikke afisolere mere af ledningerne end anvist, for så kan sådanne blanke ledninger udgøre et faremoment efter montering på klemmerækken.

18 **Advarsel**: Ved installering af dette udstyr skal steljord altid forbindes først og aftages sidst.

19 **Forsigtig**: “Fare” Se omhyggeligt efter om der stikker blanke kobbertråde ud fra klemmeforbindelserne. Ved korrekt montering er det ikke tilfældet. Enhver afisoleret leder kan lede farlig strømstyrke til personer, som kommer til at røre ved dem.

20 **Bemærk**: Dette udstyr kan køre både på jævnstrøm med positiv og med negativ jord.

21 Lithium batteri - Bør kun udskiftes af uddannet og kvalificeret tekniker.
Advarsel : Eksplosionsfare, hvis batteriet udskiftes ukorrekt. Udskift kun med samme eller en tilsvarende type der anbefales af producenten. Kassér brugte batterier i overensstemmelse med producentens instruktioner.

Eisen: Dit product voldoet aan de volgende eisen.

1	RFI Emissie	EN55022 Klasse A, EN61000-3-2, EN61000-3-3
3	Immuniteit	EN55024
4	Electrische Veiligheid	EN60950, UL1950, CSA 950
5	Laser	EN60825

Veiligheid

6 **Waarshuwing:** Klasse-1 laser produkt.

7 **Waarchuwing:** Neit in de straal staren.

8 **Waarschuwingen Met Betrekking Tot Elektriciteit**
Waarschuwing: GEVAAR VOOR ELEKTRISCHE SCHOKKEN
Verwijder het deksel niet, teneinde ELEKTRISCHE schokken te voorkomen. Binnenin bevinden zich geen onderdelen die door de gebruiker onderhouden kunnen worden. Dit toestel staat onder GEVAARLIJKE SPANNING en mag alleen worden geopend door een daartoe opgeleide en bevoegde technicus. Om het gevaar op ELEKTRISCHE SCHOKKEN te vermijden, moet u het toestel van de stroombron ontkoppelen alvorens de LAN-kabels te koppelen of ontkoppelen.

9 **Gevaar Voor Blikseminslag**
Gevaar: NIET aan toestellen of KABELS WERKEN bij BLIKSEM.

10 **Waarschuwing:** Het toestel wordt uitgeschakeld door de stroomkabel te ontkoppelen. Om het toestel stroomloos te maken: De stroomkabel ontkoppelen.

11 ELEKTRISCHE TOESTELLEN VAN KLASSE 1
DIT TOESTEL MOET GEAARD WORDEN. De stekker moet aangesloten zijn op een juist geaarde contactdoos. Een onjuist geaarde contactdoos kan de metalen onderdelen waarmee de gebruiker eventueel in aanraking komt onder gevaarlijke spanning stellen.

12 Aan Te Sluiten Apparatuur, de contactdoos wordt in de nabijheid van de apparatuur geïnstalleerd en is gemakkelijk te bereiken."

13 **Opgelet:** De ventilatiegaten mogen niet worden gesperd en moeten de omgevingslucht ongehinderd toelaten voor afkoeling.

14 **Bedrijfstemperatuur:** De omgevingstemperatuur voor dit produkt mag niet meer bedragen dan 40 graden Celsius.

15 **Alle Landen:** het toestel installeren overeenkomstig de lokale en nationale elektrische voorschriften.

16 Waarschuwing: Op de kabel die op de LAN-apparatuur wordt aangesloten dient een zekering van 10 amp te worden gemonteerd aan de zijde van de aansluiting op de voeding.

Sluit bedrading ALTIJD eerst op de LAN-apparatuur aan en pas daarna op de zekering. Voorkom het risico op een elektrische schok en schakel eerst de voeding uit. Controleer voordat u de bedrading op de zekering aansluit altijd of de zekering zich in de stand UIT bevindt.

17 **Waarschuwing**: Verwijder niet meer dan de aanbevolen hoeveelheid isolatiemateriaal. Als u meer dan de aanbevolen hoeveelheid verwijdert, kan dit een veiligheidsrisico veroorzaken doordat draden bloot blijven liggen na aansluiting op het blok.

18 **Waarschuwing**: Zorg er tijdens installatie van de apparatuur altijd voor dat de aardeaansluiting van het frame als eerste wordt geplaatst en als laatste wordt losgemaakt.

19 Let op: “Veiligheidsrisico” Controleer of er bij de aangesloten bedrading geen koper blootligt. Als de installatie juist is uitgevoerd, is er bij het aansluitblok geen koperdraad zichtbaar. Blootliggende bedrading kan schadelijke elektriciteitsniveaus geleiden naar personen die met de draden in aanraking komen.

20 **Opmerking**: Dit systeem werkt met positief geaarde of negatief geaarde DC-systemen.

21 Lithium batterij. Mag alleen worden vervangen door een daartoe opgeleide en bevoegde technicus. **Opgelet**: Gevaar voor ontploffing indien de batterij verkeerd wordt vergangen.

Alleen vervangen door hetzelfde of een gelijkwaardig, door de fabrikant aanbevolen type.

Normes: ce produit est conforme aux normes de suivantes:

1 Emission d’interférences radioélectriques — EN55022 Classe A, EN61000-3-2, EN61000-3-3

2 **Mise En Garde**: dans un environnement domestique, ce produit peut provoquer des interférences radioélectriques. Auquel cas, l’utilisateur devra prendre les mesures adéquates.

3 Immunité — EN55024

4 Sécurité électrique — EN60950, UL1950, CSA 950

5 Laser — EN60825

Sécurité

6 **Attention**: Producit laser di classe 1.

7 **Attention**: Ne pas fixer le faisceau des yeux.

8 **Information Sur Les Risques Électriques**
Avertissement: DANGER D’ÉLECTROCUTION
Pour éviter toute ÉLECTROCUTION, ne pas ôter le revêtement protecteur du matériel. Ce matériel ne

contient aucun élément réparable par l'utilisateur. Il comprend des TENSIONS DANGEREUSES et ne doit être ouvert que par un technicien dûment qualifié. Pour éviter tout risque d'ÉLECTROCUTION, débrancher le matériel avant de connecter ou de déconnecter les câbles LAN.

9 **Danger De Foudre**
Danger: NE PAS MANIER le matériel ou les CÂBLES lors d'activité orageuse.

10 **Attention:** Le cordon d'alimentation sert de mise hors circuit. Pour couper l'alimentation du matériel, débrancher le cordon.

11 ÉQUIPEMENT DE CLASSE 1 ÉLECTRIQUE
CE MATÉRIEL DOIT ÊTRE MIS A LA TERRE. La prise de courant doit être branchée dans une prise femelle correctement mise à la terre car des tensions dangereuses risqueraient d'atteindre les pièces métalliques accessibles à l'utilisateur.

12 Equipement Pour Branchement Electrique, la prise de sortie doit être placée près de l'équipement et facilement accessible".

13 **Attention:** Ne pas bloquer les fentes d'aération, ceci empêcherait l'air ambiant de circuler librement pour le refroidissement.

14 **Température De Fonctionnement:** Ce matériel est capable de tolérer une température ambiante maximum de ou 40 degrés Celsius.

15 **Pour Tous Pays:** Installer le matériel conformément aux normes électriques nationales et locales.

16 **Avertissement**: Par mesure de sécurité, un disjoncteur de 10 A doit être installé au point d'alimentation électrique du câble devant être utilisé avec cet équipement de réseau local (LAN).

Connectez TOUJOURS le câblage à l'équipement LAN avant de le connecter au disjoncteur. Pour éviter tout risque de blessure corporelle par électrocution, ne travaillez pas lorsque le matériel est sous tension. Assurez-vous toujours que le disjoncteur est bien en position d'ARRET avant de le connecter au câblage.

17 **Avertissement**: Ne coupez pas une quantité de câble supérieure à celle qui est recommandée. Cela pourrait constituer un risque de sécurité en laissant du câblage à nu sur le bornier après l'installation.

18 **Avertissement**: Lors de l'installation de cet équipement, vérifiez toujours que la connexion de terre du châssis est installée en premier et débranchée en dernier.

19 **Attention**: "Risque de sécurité" Vérifiez qu'aucun fil de cuivre dénudé ne sort du câble installé. Lorsque cette installation est effectuée correctement, aucun fil de cuivre ne devrait dépasser du bornier. Tout câblage dénudé peut être conducteur de tensions dangereuses pour les personnes touchant les câbles.

20 **Remarque**: Ce système peut fonctionner avec des systèmes C.C. dotés d'une mise à la terre positive ou négative.

21 Pile en Lithium--Doit uniquement être remplacée par un technicien dûment qualifié
Attention : Un danger d'explosion existe en cas de remplacement incorrect de la pile. Remplacer uniquement avec une pile du même type ou d'un type recommandé par le fabricant. Mettre au rebut les piles usagées conformément aux instructions du fabricant).

Standardit: Tämä tuote on seuraavien standardien mukainen.

1 Radioaaltojen häirintä EN55022 Luokka A, EN61000-3-2, EN61000-3-3

2 Varoitus: Kotiolosuhteissa tämä laite voi aiheuttaa radioaaltojen häiröitä, missä tapauksessa laitteen käyttäjän on mahdollisesti ryhdyttävä tarpeellisiin toimenpiteisiin.

3 Kestävyys EN55024

4 Sähköturvallisuus EN60950, UL1950, CSA 950

5 Laser EN60825

Turvallisuus

6 **Varoitus:** Luokan 1 Lasertuote.

7 **Variotus:** Älä katso säteeseen.

8 **Sähköön Liittyviä Huomautuksia**
Varoitus: SÄHKÖISKUVAARA
Estääksesi SÄHKÖISKUN älä poista kantta. Sisällä ei ole käyttäjän huollettavissa olevia osia. Tämä laite sisältää VAARALLISIA JÄNNITTEITÄ ja sen voi avata vain koulutettu ja pätevä teknikko. Välttääksesi SÄHKÖISKUN mahdollisuuden katkaise sähkövirta tuotteeseen ennen kuin liität tai irrotat paikallisverkon (LAN) kaapelit.

9 **Salamaniskuvaara**
Hengenvaara: ÄLÄ TYÖSKENTELE laitteiden tai KAAPELEIDEN KANSSA SALAMOINNIN AIKANA.

10 **Huomautus:** Virtajohtoa käytetään virrankatkaisulaitteena. Virta katkaistaan irrottamalla virtajohto.

11 SÄHKÖ - TYYPPILUOKAN 1 LAITTEET
TÄMÄ LAITE TÄYTYY MAADOITTAA. Pistoke täytyy liittää kunnollisesti maadoitettuun pistorasiaan. Virheellisesti johdotettu pistorasia voi altistaa metalliosat vaarallisille jännitteille.

12 **Pistorasiaan Kytkettävä Laite:** pistorasia on asennettava laitteen lähelle ja siihen on oltava esteetön pääsy."

13 **Huomautus:** Ilmavaihtoreikiä ei pidä tukkia ja niillä täytyy olla vapaa yhteys ympäröivään huoneilmaan, jotta ilmanvaihto tapahtuisi.

14 **Käyttölämpötila:** Tämä tuote on suunniteltu ympäröivän ilman maksimilämpötilalle 40°C.

15 **Kaikki Maat:** Asenna tuote paikallisten ja kansallisten sähköturvallisuusmääräysten mukaisesti.

16 Varoitus: Tämän LAN-laitteen kanssa käytettävän kaapelin syöttöpäähän tulee turvallisuussyistä asentaa 10 A virrankatkaisin.

Yhdistä johdot AINA ensin LAN-laitteeseen ennen virrankatkaisimeen kytkemistä. Sähköiskusta johtuvien vammojen välttämiseksi älä käsittele JÄNNITTEELLISIÄ johtoja. Varmista aina, että virrankatkaisin on pois päältä (OFF) ennen kuin yhdistät johdot katkaisimeen.

17 **Varoitus**: Älä poista johtimesta päällystettä enempää kuin on suositeltu. Päällysteen poistaminen suositusta pidemmältä matkalta voi aiheuttaa turvallisuusriskin, sillä riviliittimeen jää asennuksen jälkeen paljaita johtimia.

18 **Varoitus**: Kun asennat tätä laitetta, varmista aina, että runkomaadoitettu liitin kytketään ensin ja irrotetaan viimeiseksi.

19 **Huomio**: Turvallisuusriski Tarkista, ettei asennetusta johtimesta näy paljaita kuparisäikeitä. Kun asennus suoritetaan oikein, riviliittimestä ei pitäisi näkyä paljaita kuparijohdinsäikeitä. Paljaat johtimet voivat aiheuttaa sähköiskuvaaran, jos niihin kosketaan.

20 **Huomaa**: Tämä järjestelmä toimii positiivisesti tai negatiivisesti maadoitettujen tasavirtajärjestelmien kanssa.

21 Litiumparisto - Vaihdon voi suorittaa vain koulutettu ja pätevä teknikko.
Varoitus: Räjähdysvaara, jos paristo on vaihdettu väärin. Vaihda vain samaan tai vastaavaan tyyppiin, jota valmistaja suosittelee. Hävitä käytetyt paristot valmistajan ohjeiden mukaan.

Standard: Questo prodotto è conforme ai seguenti standard.

1 Emissione RFI (interferenza di radiofrequenza) EN55022 Classe A, EN61000-3-2, EN61000-3-3

2 **Avvertenza:** in ambiente domestico questo prodotto potrebbe causare radio interferenza. In questo caso potrebbe richiedersi all'utente di prendere gli adeguati provvedimenti.

3 Immunità EN55024

4 Sicurezza elettrica EN60950, UL1950, CSA 950

5 Laser EN60825

Norme Di Sicurezza

6 **Avvertenza**: Prodotto laser di Classe 1.

7 **Avertenza:** Non fissare il raggio con gli occhi.

8 **Avvertenze Elettriche**
Attenzione: PERICOLO DI SCOSSE ELETTRICHE
Per evitare SCOSSE ELETTRICHE non asportare il coperchio. Le componenti interne non sono riparabili dall'utente. Questa unità ha TENSIONI PERICOLOSE e va aperta solamente da un tecnico specializzato e qualificato. Per evitare ogni possibilità di SCOSSE ELETTRICHE, interrompere l'alimentazione del dispositivo prima di collegare o staccare i cavi LAN.

9 **Pericolo Di Fulmini**
Pericolo: NON LAVORARE sul dispositivo o sui CAVI durante PRECIPITAZIONI TEMPORALESCHE.

10 **Attenzione:** Il cavo di alimentazione è usato come dispositivodi disattivazione. Per togliere la corrente al dispositivo staccare il cavo di alimentazione.

11 ELETTRICITÀ - DISPOSITIVI DI CLASSE 1
QUESTO DISPOSITIVO DEVE AVERE LA MESSA A TERRA. La spina deve essere inserita in una presa di corrente specificamente dotata di messa a terra. Una presa non cablata in maniera corretta rischia di scaricare una tensione pericolosa su parti metalliche accessibili.

12 Apparecchiatura Collegabile, la presa va installata vicino all'apparecchio per risultare facilmente accessibile".

13 **Attenzione:** le prese d'aria non vanno ostruite e devono consentire il libero ricircolo dell'aria ambiente per il raffreddamento.

14 **Temperatura Di Funzionamento:** Questo prodotto è concepito per una temperatura ambientale massima di 40 gradi centigradi.

15 **Tutti I Paesi:** installare il prodotto in conformità delle vigenti normative elettriche nazionali.

16 **Avvertenza**: A titolo di cautelativo, installare un interruttore di sicurezza da 10 ampere sull'estremità in entrata del cavo di alimentazione di questa apparecchiatura LAN.

Collegare SEMPRE il cablaggio prima all'apparecchiatura LAN e poi all'interruttore. Per evitare i infortuni causati da folgorazione, non lavorare su cavi SOTTO TENSIONE. Prima di collegare il cavo all'interruttore di sicurezza, accertarsi sempre che quest'ultimo sia disinserito.

17 **Avvertenza**: Per evitare i possibili pericoli associati all'esposizione dei fili sulla morsettiera dopo l'installazione, non rimuovere l'isolamento oltre le misure specificate.

18 **Avvertenza**: Quando si installa questo apparecchio, accertarsi sempre che il collegamento a massa del telaio sia sempre il primo ad essere effettuato e l'ultimo ad essere scollegato.

19 **Attenzione**: "Pericolo!" Controllare che il filo installato non abbia trefoli in rame esposti. Se l'installazione è stata effettuata in modo corretto, non vi deve protrudere dalla morsettiere alcun trefolo in rame esposto. In caso di contatto, un filo esposto può condurre livelli di elettricità pericolosi a quanti lo tocchino.

20 **Nota**: Questo sistema funziona con sistemi a CC con massa positiva o negativa.

21 Batteria al litio - Va sostituita solo da un tecnico specializzato e qualificato.
Attenzione: l'errata sostituzione della batteria può causare pericolo di esplosioni.

Sostituire solamente con lo stesso tipo o con uno equivalente raccomandato dal produttore. Eliminare le batterie usate secondo le istruzioni del produttore.

Sikkerhetsnormer: Dette produktet tilfredsstiller følgende sikkerhetsnormer.

1 RFI stråling EN55022 Klasse A, EN61000-3-2, EN61000-3-3

2 **Advarsel**: Hvis dette produktet benyttes til privat bruk, kan produktet forårsake radioforstyrrelse. Hvis dette skjer, må brukeren ta de nødvendige forholdsregler.

3 Immunitet EN55024

4 Elektrisk sikkerhet EN60950, UL1950, CSA 950

5 Laser EN60825

Sikkerhet

6 **Advarsel:** Laserprodukt av klasse 1.

7 **Advarsal:** Stirr ikke på strålen.

8 **Elektrisitet**
Advarsel: FARE FOR ELEKTRISK SJOKK
For å unngå ELEKTRISK sjokk, må dekslet ikke tas av. Det finnes ingen deler som brukeren kan reparere på innsiden. Denne enheten inneholder FARLIGE SPENNINGER, og må kun åpnes av en faglig kvalifisert tekniker. For å unngå ELEKTRISK SJOKK må den elektriske strømmen til produktet være avslått før LAN-kablene til- eller frakobles.

9 **Fare For Lynnedslag**
Fare: ARBEID IKKE på utstyr eller KABLER i TORDENVÆR.

10 **Forsiktig:** STRØMLEDNINGEN BRUKES TIL Å FRAKOBLE UTSTYRET. FOR Å DEAKTIVISERE UTSTYRET, må strømforsyningen kobles fra.

11 ELEKTRISK - TYPE 1- KLASSE UTSTYR
DETTE UTSTYRET MÅ JORDES. Strømkontakten må være tilkoplet en korrekt jordet kontakt. En kontakt som ikke er korrekt jordet kan føre til farlig spenninger i lett t ilgjengelige metalldeler.

12 Utstyr For Stikkontakt. Stikkontakten skal monteres i nærheten av utstyret og skal være lett tilgjengelig."

13 **Forsiktig:** Lufteventilene må ikke blokkeres, og må ha fri tilgang til luft med romtemperatur for avkjøling.

14 **Driftstemperatur:** Dette produktet er konstruert for bruk i maksimum romtemperatur på 40 grader celsius.

15 **Alle Land:** Produktet må installeres i samsvar med de lokale og nasjonale elektriske koder.

16 **Advarsel**: Av sikkerhetshensyn bør en automatsikring på 10 A monteres i forsyningsenden av kabelen som skal brukes sammen med dette LAN-utstyret.

Du skal ALLTID først kople ledningene til LAN-utstyret før du kopler ledningene til automatsikringen. Arbeid aldri med ledninger uten at strømmen er slått av, ettersom det ellers kan være fare for personskader som følge av elektrisk støt. Pass alltid på at automatsikringer er slått AV før du kopler ledningene til automatsikringen.

17 **Advarsel**: Du skal ikke avisolere mer av ledningen enn det som er anbefalt. Dersom du avisolerer mer enn det som er anbefalt, kan dette forårsake en sikkerhetsfare, ettersom det vil finnes uisolert ledning på rekkeklemmen etter montering.

18 **Advarsel**: Når du monterer dette utstyret, skal du alltid passe på at forbindelsen til rammejordingen monteres først og koples fra sist.

19 **Forsiktig**: “Sikkerhetsfare” Kontroller om uisolerte koppertråder stikker ut av den monterte ledningen. Hvis monteringen er riktig utført, skal det ikke finnes uisolerte kobbertråder som stikker ut fra rekkeklemmen. Uisolerte ledninger kan lede skadelige mengder strøm til personer som berører ledningene.

20 **Merknad**: Systemet fungerer med positivt og negativt jordede likestrømssystemer.

21 Litiumbatteri - Må kun byttes ut av en faglig kvalifisert tekniker.
Forsiktig: Eksplosjonsfare hvis batteriet feilinnsettes.

Batteriet må bare erstattes med samme type eller en tilsvarende type som er anbefalt av fabrikanten. Batteriene må kasseres i samsvar med fabrikantens instruksjoner.

Padrões: Este produto atende aos seguintes padrões.

1 Emissão de interferência de radiofrequência — EN55022 Classe A, EN61000-3-2, EN61000-3-3

2 **Aviso**: Num ambiente doméstico este produto pode causar interferência na radiorrecepção e, neste caso, pode ser necessário que o utente tome as medidas adequadas.

3 Imunidade — EN55024

4 Segurança Eléctrica — EN60950, UL1950, CSA 950

5 Laser — EN60825

Segurança

6 Aviso: Produto laser de classe 1

7 **Aviso:** Não olhe fixamente para o raio.

8 **Avisos Sobre Características Elétricas**
Atenção: PERIGO DE CHOQUE ELÉTRICO
Para evitar CHOQUE ELÉTRICO, não retire a tampa. Não contém peças que possam ser consertadas pelo usuário. Este aparelho contém VOLTAGENS PERIGOSAS e só deve ser aberto por um técnico qualificado e treinado. Para evitar a possibilidade de CHOQUE ELÉTRICO, desconecte o aparelho da fonte de energia elétrica antes de conectar e desconectar os cabos da LAN.

9 **Perigo De Choque Causado Por Raio**
Perigo: NÃO TRABALHE no equipamento ou nos CABOS durante períodos suscetíveis a QUEDAS DE RAIO.

10 **Cuidado:** O CABO DE ALIMENTAÇÃO É UTILIZADO COMO UM DISPOSITIVO DE DESCONEXÃO. PARA DESELETRIFICAR O EQUIPAMENTO, desconecte o cabo de ALIMENTAÇÃO.

11 ELÉTRICO - EQUIPAMENTOS DO TIPO CLASSE 1
DEVE SER FEITA LIGAÇÃO DE FIO TERRA PARA ESTE EQUIPAMENTO. O plugue de alimentação deve ser conectado a uma tomada com adequada ligação de fio terra. Tomadas sem adequada ligação de fio terra podem transmitir voltagens perigosas a peças metálicas expostas.

12 Equipamento De Ligação, a tomada eléctrica deve estar instalada perto do equipamento e ser de fácil acesso."

13 **Cuidado:** As aberturas de ventilação não devem ser bloqueadas e devem ter acesso livre ao ar ambiente para arrefecimento adequado do aparelho.

14 **Temperatura De Funcionamento:** Este produto foi projetado para uma temperatura ambiente máxima de 40 graus centígrados.

15 **Todos Os Países:** Instale o produto de acordo com as normas nacionais e locais para instalações elétricas.

16 **Aviso**: Como medida de precaução, deve instalar-se um disjuntor de 10 Amp na extremidade de alimentação do cabo a ser usado com este equipamento LAN.

Ligue SEMPRE os cabos ao equipamento LAN primeiro antes de os ligar ao disjuntor. Para evitar o perigo de ferimentos por choque eléctrico, não trabalhe com alimentadores LIGADOS. Verifique sempre se o disjuntor está na posição OFF (desligado) antes de ligar os cabos ao mesmo.

17 **Aviso**: Não corte mais fio do que recomendado. Cortar mais do que o recomendado pode ser perigoso, por deixar fio exposto no terminal depois da instalação.

18 **Aviso**: Ao ligar este equipamento, instale sempre primeiro a ligação à terra e desligue-a sempre em último.

19 **Atenção**: "Perigo" Verifique se há algum fio de cobre exposto a sair do fio instalado. Quando esta instalação é feita correctamente não deve haver qualquer fio de cobre exposto a sair do terminal. Qualquer fio exposto pode conduzir níveis perigosos de electricidade para a pessoa que toque nos fios.

20 **Nota**: Este sistema funciona com sistemas CC com ligações à terra Positivas ou Negativas.

21 Bateria de lítio - Só deve ser trocada por técnico qualificado e treinado.

Cuidado: Se a bateria não for devidamente instalada há perigo de explosão. Substitua somente pelo mesmo tipo ou equivalente, conforme recomendado pelo fabricante. Descarte baterias usadas, de acordo com as instruções fornecidas pelo fabricante.

Estándares: Este producto cumple con los siguientes estándares.

1 Emisión RFI EN55022 Clase A, EN61000-3-2, EN61000-3-3

2 **Advertencia**: en un entorno doméstico, este producto puede causar radiointerferencias, en cuyo caso, puede requerirse del usuario que tome las medidas que sean convenientes al respecto.

3 Inmunidad EN55024

4 Seguridad eléctrica EN60950, UL1950, CSA 950

5 Laser EN60825

SEGURIDAD

6 ¡**Advertencia**! Producto láser Clase 1.

7 **¡Advertencia!** No mirat fijamente el haz.

8 **AVISOS ELECTRICOS**
Advertencia: PELIGRO DE ELECTROCHOQUE
Para evitar un ELECTROCHOQUE, no quite la tapa. No hay ningún componente en el interior al cual puede prestar servicio el usuario. Esta unidad contiene VOLTAJES PELIGROSOS y sólo deberá abrirla un técnico entrenado y calificado. Para evitar la posibilidad de ELECTROCHOQUE desconecte la corriente eléctrica que llega al producto antes de conectar o desconectar los cables LAN.

9 **PELIGRO DE RAYOS**
Peligro: NO REALICE NINGUN TIPO DE TRABAJO O CONEXION en los equipos o en LOS CABLES durante TORMENTAS ELECTRICAS.

10 **Atencion:** EL CABLE DE ALIMENTACION SE USA COMO UN DISPOSITIVO DE DESCONEXION. PARA DESACTIVAR EL EQUIPO, desconecte el cable de alimentación.

11 ELECTRICO - EQUIPO DEL TIPO CLASE 1
ESTE EQUIPO TIENE QUE TENER CONEXION A TIERRA. El cable tiene que conectarse a un enchufe a tierra debidamente instalado. Un enchufe que no está correctamente instalado podría ocasionar tensiones peligrosas en las partes metálicas que están expuestas.

12 EQUIPO CONECTABLE, el tomacorriente se debe instalar cerca del equipo, en un lugar con acceso fácil".

13 **ATENCION:** Las aberturas para ventilación no deberán bloquearse y deberán tener acceso libre al aire ambiental de la sala para su enfriamiento.

14 **TEMPERATURA REQUERIDA PARA LA OPERACIÓN:** Este producto está diseñado para una temperatura ambiental máxima de 40 grados C.

15 **PARA TODOS LOS PAÍSES:** Monte el producto de acuerdo con los Códigos Eléctricos locales y nacionales.

16 **Advertencia**: Por razones de precaución, se debe instalar un cortacircuitos de 10 amperios en el extremo de alimentación del cable que se utilizará con este equipo LAN.

SIEMPRE conecte los cables al equipo LAN primero, antes de conectarlos al cortacircuitos. Para evitar el peligro de sufrir daños corporales a causa de sacudidas eléctricas, no trabaje con conductores CON CORRIENTE. Asegúrese siempre de que el cortacircuitos esté en la posición de APAGADO (OFF) antes de conectar los cables al cortacircuitos.

17 **Advertencia**: No pele el cable más de la cantidad recomendada, ya que si después de instalar el bloque terminal quedan cables pelados, habrá riesgos de seguridad.

18 **Advertencia**: Cuando instale dicho equipo, asegúrese siempre de que el bastidor se conecte a tierra primero y se desconecte por último.

19 **Cuidado**: "Riesgo de seguridad" Cerciórese de que no haya hilos de cobre pelados que salgan del alambre instalado. Cuando dicha instalación se realiza correctamente, los hilos de cobre pelados no deben salir del bloque terminal. Todo alambre pelado puede conducir niveles de electricidad nocivos a la persona que lo toca.

20 **Nota**: Este sistema funcionará con sistemas de CC con conexión positiva o negativa a tierra.

21 Batería de litio - Sólo deberá ser cambiada por un técnico entrenado y calificado.

Atencion: Peligro de explosión si la batería no se reemplaza en forma correcta. Reemplace sólo con el mismo tipo o equivalente que recomienda el fabricante. Deseche las baterías usadas según las instrucciones del fabricante.

Standarder: Denna produkt uppfyller följande standarder.

1 Radiostörning EN55022 Klass A, EN61000-3-2, EN61000-3-3

2 **Varning**: Denna produkt kan ge upphov till radiostörningar i hemmet, vilket kan tvinga användaren till att vidtaga erforderliga åtgärder.

3 Immunitet EN55024

4 Elsäkerhet EN60950, UL1950, CSA 950

5 Laser EN60825

Säkerhet

6 **Varning!** Laserprodukt av klass 1.

7 **Varning!** Laserstrålning när enheten är öppen.

8 **Tillkännagivanden Beträffande Elektricitetsrisk:**
RISK FÖR ELEKTRISK STÖTFör att undvika ELEKTRISK stöt, ta ej av locket. Det finns inga delar inuti som behöver underhållas. Denna apparat är under HÖGSPÄNNING och får endast öppnas av en utbildad kvalificerad tekniker. För att undvika ELEKTRISK STÖT, koppla ifrån produktens strömanslutning innan LAN-kablarna ansluts eller kopplas ur.

9 **Fara För Blixtnedslag**
Fara: ARBETA EJ på utrustningen eller kablarna vid ÅSKVÄDER.

10 **Varning:** NÄTKABELN ANVÄNDS SOM STRÖMBRYTARE FÖR ATT KOPPLA FRÅN STRÖMMEN, dra ur nätkabeln.

11 ELEKTRISKT - TYP KLASS 1 UTRUSTNING
DENNA UTRUSTNING MÅSTE VARA JORDAD. Nätkabeln måste vara ansluten till ett ordentligt jordat uttag. Ett felaktigt uttag kan göra att närliggande metalldelar utsätts för högspänning. Apparaten skall anslutas till jordat uttag, när den ansluts till ett nätverk.

12 Utrustning Med Plugg. Uttaget skall installeras i utrustningens närhet och vara lättåtkomligt".

13 **Varning:** Luftventilerna får ej blockeras och måste ha fri tillgång till omgivande rumsluft för avsvalning.

14 **Driftstemperatur:** Denna produkt är konstruerad för rumstemperatur ej överstigande 40 grader Celsius.

15 **Alla Länder:** Installera produkten i enlighet med lokala och statliga bestämmelser för elektrisk utrustning.

16 **Varning**: Av säkerhetsskäl skall en 10 A automatsäkring anslutas till försörjningsänden på kabeln som används till denna LAN-utrustning.

Ledningar skall ALLTID anslutas till LAN-utrustningen innan ledningarna ansluts till automatsäkringen. För att förebygga uppkomsten av personskador orsakade av elektrisk stöt skall man inte vidröra strömförande uttag. Kontrollera alltid att automatsäkringen är i läget OFF (AV) innan anslutning av ledningar till automatsäkringen sker.

17 **Varning**: Skala inte av mer isolering än vad som anges ovan. Skalas för mycket isolering av kan fara uppstå om oskyddad tråd vidröras på anslutningsplinten efter anslutningen.

18 **Varning**: Vid anslutning av denna utrustning skall man alltid se till att jordtråden ansluts först och lossas sist.

19 **Obs! Fara**! Kontrollera om små koppartrådar sticker ut ifrån den anslutna tråden. Om anslutningen utförts riktigt sticker inga trådar ut från anslutningsplinten. Oisolerade trådar kan överföra skadlig elektricitet till person som vidrör trådarna.

20 **Anmärkning**: Detta system fungerar både med positivt och negativt jordade likströmskällor.

21 Litium batteri - Får endast bytas av utbildade och kvalificerade tekniker.

Varning: Risk för explosion om felaktigt batteri används. Byt endast mot samma eller likvärdig typ batteri, rekommenderat av tillverkaren. Kassera använda batterier i enlighet med tillverkarens instruktioner.